The Builder.

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"Notes on Hospitals."

EVER was change more complete than that which has occurred in hospital building since we initiated in these pages the movement against the defective plans in use, and showed the advantages of the pavilion system of arrangement now universally adopted. When we asserted with reference to the plans determined on for the new hospital at Netley, before the building was out of the ground, that if these were carried out the hospital would kill more than it would cure; that patients would have a better chance of recovery under a tent in a field than in such a structure, it was met with derision, and we received an amount of personal abuse from various quarters which would scarcely be credited if described. We were quite contented to wait; and had not to wait long. In a very few months the objections raised were generally admitted, and a repetition of the errors there fallen into is not likely to occur for some time to come. The efforts made in these pages to set forth a good system of hospital construction were ably followed up by Miss Nightingale, and the publication of that lady's excellent "Notes on Hospitals" settled the question. These "Notes" have grown, and the object of our present writing is to make known to our readers the appearance of an enlarged edition of the book.* It treats the subject under nine heads:—1. The sanitary condition of hospitals; 2. The defects in existing hospital plans and construction; 3. The principles of construction which ought to be kept in view in building new hospitals; 4. Improved hospital plans; 5. Convalescent hospitals; 6. Children's hospitals; 7. Indian military hospitals; 8. Hospitals for soldiers' wives; and 9. Hospital statistics; with an appendix treating of different systems of hospital nursing. It further contains good clear plans of eleven hospitals, many woodcuts, and sketch-plans of London and of Paris, showing the relative position of the larger hospitals and their distance in direct lines from one central point.

In proof of the condition of some of the existing hospitals, a table of the mortality *per cent.* in the principal hospitals is given at starting, which shows that we have twenty-four London hospitals, affording a mortality of no less than 90·84 per cent., very nearly every bed yielding a death in the course of the year. Next, we have twelve hospitals in large provincial towns, Bristol, Birmingham, Liverpool, Manchester, &c., yielding a death-rate of 83·16 per cent. And there are twenty-five county hospitals in country towns, the mortality in which is no more than 39·41 per cent. "Here we have at once a hospital problem demanding solution. However the great differences in the death-rates may be explained, it cannot be denied that the most unhealthy hospitals are those situate within the vast circuit of the metropolis; that the next lower death-rate takes place in hospitals in densely populated large manufacturing and commercial towns; and that by far the most healthy hospitals are those of the smaller country towns."

The sanitary state of any hospital ought not, however, to be inferred solely from the greater or less mortality. If the function of a hospital were to kill the sick, statistical comparisons of this nature would be admissible. As, however, its proper function is to restore the sick to health as speedily as possible, the elements which really give information as to whether this is done or not, are those which show the proportion of sick restored to health, and the average time which has been required for this object. A hospital which restored all its sick to health after an average of six months' treatment, could not be considered as by any means so healthy as a hospital which returned all its sick recovered in as many weeks.

The master of some large works in London lately mentioned the following fact:—He was in the habit of sending those of his workmen who met with accidents to two different metropolitan hospitals. In one they recovered quickly; in the other they were frequently attacked with erysipelas, and some cases were fatal. On inquiry, it appeared that in the former hospital a larger amount of space was allowed than in the latter, which is also so deficient in external ventilation and in construction, that nothing but artificial ventilation could effectively change its atmosphere.

The want of fresh air, Miss Nightingale justly remarks, may be detected in the appearance of patients sooner than any other want. No care or luxury will compensate, indeed, for its absence. Unless the air *within* the ward can be kept as fresh as it is *without*, the patients had better be away. What must then be said when, as in some town situations, the air *without* is not fresh air at all? *No* artificial ventilation will suffice. Although in badly-constructed hospitals, or in countries where fuel is dear, and the winter very cold, artificial ventilation may be necessary, it never can compensate for the want of the open window. The ward is never fresh, and in the best hospitals at Paris, artificially ventilated, it will be found that, till the windows are opened, the air is close.

Natural ventilation is the only efficient means for procuring the life-spring of the sick,—fresh air; but to obtain this the ward should be at least from 15 to 16 feet high, and the distance between the opposite windows not more than 30 feet. The amount of fresh air required for ventilation has been hitherto very much underrated, because it has been assumed that the quantity of carbonic acid produced during respiration was the chief noxious gas to be carried off. The total amount of this gas produced by an adult in twenty-four hours is about 40,000 cubic inches, which in a barrack-room, say, containing sixteen men, would give 370 cubic feet *per diem*.

"Allowing eight hours for the night occupation of such a room, when the doors and windows may be supposed to be shut, the product of carbonic acid would be 123 cubic feet, or about 15½ cubic feet per hour. This large quantity, if not speedily carried away, would undoubtedly be injurious to health; but there are other gaseous poisons produced with the carbonic acid which have still greater power to injure. Every adult exhales by the lungs and skin forty-eight ounces, or three pints of water, in twenty-four hours. Sixteen men in a room would therefore exhale in eight hours sixteen pints of water, and 123 cubic feet of carbonic acid, into the atmosphere of the room. With the watery vapour there is also exhaled a large quantity of organic matter, ready to enter into the putrefactive condition. This is especially the case during the hours of sleep; and as it is a vital law that all excretions are injurious to health if re-introduced into the system, it is easy to understand how the breathing of damp foul air of this kind, and the consequent re-introduction of excrementitious matter into the blood through the function of respiration, will tend to produce disease."

If this be so for the well, how much more will it be so for the sick?—for the sick, the exhalations from whom are always highly morbid and dangerous, as they are one of nature's methods of eliminating noxious matter from the body, in order that it may recover health.

Second only to fresh air, we should be inclined to rank light in importance for the sick. Direct sunlight, not only daylight, is necessary for speedy recovery, except, perhaps, in certain ophthalmic, and a small number of other cases. Instances could be given, almost endless, where, in dark wards or in wards with a northern aspect, even when thoroughly warmed, or in wards with borrowed light, even when thoroughly ventilated, the sick could not by any means be made speedily to recover. Dark barrack-rooms, and barrack-rooms with northern aspects, will furnish a larger amount of sickness than light and sunny rooms.

Among kindred effects of light, Miss Nightingale mentions, from experience, as quite perceptible in promoting recovery, the being able to see out of a window, instead of looking against a dead wall; the bright colours of flowers, and the being able to read in bed by the light of a window close to the bed-head. It is generally said that the effect is upon the mind. Perhaps so; but it is no less so upon the body on that account.

All hospital buildings in this climate should be erected so that as great a surface as possible should receive direct sunlight.

The axis of a ward should be as nearly as possible north and south; the windows on both sides, so that the sun shall shine in (from the time he rises till the time he sets) at one side or the other. There should be a window to at least every two beds, as is the case now in our best hospitals. The window-space should be one-third of the wall-space. The windows should reach from within 2 or 3 feet of the floor to 1 foot of the ceiling. The escape of heat may be diminished by plate or double glass; but while we *can* generate warmth, we cannot generate daylight, or the purifying and curative effect of the sun's rays.

Let us look to Chapter III., and re-urge some of the principles of hospital construction. The first is to divide the sick among separate pavilions. The essential feature of the pavilion construction is that of breaking up hospitals of any size into a number of separate detached parts, having a common administration, but nothing else in common. And the object sought is, that the atmosphere of no one pavilion or ward should diffuse itself to any other pavilion or ward, but should escape into the open air as speedily as possible, while its place is supplied by the purest obtainable air from the outside.

The question of a general hospital plan resolves itself, first of all, into obtaining the most healthy structure of the pavilion; and second, into arranging all the pavilions in the way best suited to obtain free external ventilation, plenty of light on all sides, and convenient means of communication. To realize these advantages, pavilions may be placed side by side, or in line.

The distance between the blocks should not be less than double the height of the blocks. This rule is specially applicable to English climates, in which it is necessary to preserve as much space as possible for sunshine. A greater distance would be better; but this would involve a greater cost for land, and a greater distance to be traversed by the hospital staff.

There should not be more than two floors of wards to the block. The most healthy hospitals have been those on one floor only; and this because they require less scientific knowledge and practical care in ventilation. If another floor

* "Notes on Hospitals." By Florence Nightingale. Third edition, enlarged, and for the most part re-written. London: Longman, Green, & Co. 1863.

is added, a community of ventilation exists between the ward below and the ward above by the common staircase, and by filtration of air upwards through the floor. And hence there is a strong conviction in the minds of careful hospital physicians, surgeons, and nurses, that patients do not recover so well on upper floors. And there are instances in which the mortality of patients on upper floors has been higher than that of the floors below. Moreover, a *sick population* requires more surface for health than a healthy population. And it is clear that, if patients are placed on three floors instead of on two, the surface overcrowding is increased by one-third, unless the distance between the pavilions is increased in a corresponding ratio.

If the pavilions are single, *i. e.*, if each staircase give access to the end of the pavilion, as in the Lariboisière and Lisbon plans, there should be only one ward on each floor. The pavilion should never be divided so that a second ward or wards is placed beyond the first, to be reached by passing through the first. The reason is, that the floor, however divided by cross-walls, can never be other than a single ward. The cross-walls only obstruct the ventilation. If the doors are accidentally left open, the foul air in one ward passes into the next, and the greatest improvement in ventilation would be to pull down all the partitions and throw the pavilion open from end to end, so as to have only one ward on the floor. But then the ward would be too large.

If the pavilions are double, *i. e.*, if each staircase gives access to a ward right and left off the staircase, as in the Herbert Hospital, provided the staircase be of spacious size, and thoroughly ventilated sides and top, two wards may be placed on each floor with safety; and with this great advantage, that administration, nursing, and discipline are all facilitated, while expense in construction is saved.

Wards of a small size are decidedly objectionable, because unfavourable to discipline, inasmuch as a small number, when placed together in the same ward, more readily associate together for any breach of discipline than a larger number.

The best size of wards for insuring the two conditions of health and facility of administration and discipline, is that for from twenty to thirty-two sick. Wards smaller than of twenty beds multiply both the attendance, unnecessarily, and the corners, unfavourably for ventilation, in proportion to the number of patients. Wards larger than of thirty-two beds are undesirable, because they require a greater height of ceiling, and are hence more costly in construction and difficult to ventilate.

Cubical space obtained by great height of the wards will not compensate for want of area around the bed.

Let us inquire what is the smallest amount of superficial area we can do with. Hospital beds are generally from 3 feet to 3 feet 6 inches wide, and 6 feet 3 inches long, the bed space being increased to 7 feet by the bed being a little removed from the wall. The mere surface required to hold the bed is hence from 21 square feet to 24½ square feet. It is quite clear that, whatever surface area is required for ventilation, administration, or for clinical instruction, must be in excess of this amount. There should be space sufficient between the sides of adjacent beds to avoid stagnation of air altogether. There should also be room for free movement of three or four persons, for the use of a night-chair without annoying the next patient, and also for a portable bath, when required. The distance from foot to foot of opposite beds should be sufficient to afford space for a movable dresser or table, benches on either side, and easy passage-way. In a well-constructed civil hospital in England, occupying a healthy, airy position, it cannot be said that 80 square feet *besides* the bed space, are too much. In round numbers, the superficial area per bed should be not less than 100 square feet.

Wards for the numbers of beds already given need not be higher than 15 feet, which would allow 1,500 cubic feet per bed.

If, however, a hospital is built in the centre of a large city, where pure air is not to be had, or in a locality where the circulation of air outside is deficient, it is hard to say what amount of space would make the building healthy.

"A good proportion for a ward of twenty patients would be 80 feet long, 25 (or 26) feet wide, and 16 (or 15) feet high. This would give 1,600 (or 1,560) cubic feet to each bed. It would give 11 (or 12) feet between foot and foot, which is not too much where there is a clinical school. It would give an average of 16 feet to each two beds in width.

Half the sick are supposed to be on each side the ward."

One window at least should be allotted for every two beds; the window to be not less than 4 feet 8 inches wide, the sill within 2 or 3 feet of the floor, so that the patient can see out, and it should go up to within 1 foot of the ceiling.

One of the most difficult points in ward construction is to find a good material for walls and ceilings. An impervious material capable of receiving a polish on a white or tinted surface would make the best lining for a hospital ward. What is wanted is such a surface as can be washed frequently with soap and water, without its being absorbed into the substance, and dried with towels, so as not to interfere with the current use of the ward. Parian cement is the nearest approach to a good material for this purpose hitherto discovered. But the polish is rather costly. And what is of more consequence, the manufacture has not yet reached such a point of perfection as to afford a surface of one uniform colour. Even the best becomes blotchy after a short time, and is liable to crack, especially when applied to ceilings. If manufacturers wish to bring this substance into general use for hospitals, they must improve the material until the cement can be applied over any required extent of wall, and retain a uniform texture, colour, and polish.

The materials used for floors may be oak wood, pine wood, or tiles. Oak wood, well seasoned, is the best. No sawdust or other organic matter capable of rotting should be placed underneath the floor. Concrete, or some similar indestructible substance, would be the best for the purpose.

A hospital floor should never be scoured. A very good hospital floor is that used at Berlin, which is oiled, lackered, and polished so as to resemble French polish. It is wet-rubbed and dry-rubbed every morning, which removes the dust. Its only objection is want of durability. The joints of the flooring must be fitted well together, and cemented with any impervious substance.

Looking again to plan, it is a fundamental principle that the pavilions, whether single or double, should contain nothing but the sick and the offices immediately required for the ward. Everything else, board-rooms, chapels, quarters for officers and servants, except for the head nurse or nurses of each ward, stores, kitchens, laundries, should be placed in a separate building or buildings. It would be better, even, that convalescent rooms, where it is determined that there should be such rooms, should be out of the main building, but accessible under cover; for the obvious reason that convalescents require change of air which cannot be obtained under any circumstances in a hospital. The matron should always have her rooms as near to the nursing staff as possible. And it is highly desirable that the day and night nurses of each ward should be kept as a separate staff, lodged as near to the head nurse as possible; if room can be found for these near their own pavilion, it is better.

Simplicity of construction, involving, as it should always do, a provision of abundant light and ventilation through every part of the hospital in which sick are placed, can only be secured in hospitals of any size by separating the administrative part from the sick part. The smallest country hospital should consist of at least two blocks of building.

We may not now continue farther our notice of Miss Nightingale's admirable book. Suffice it to say, in conclusion, that all who are concerned, or are likely to be concerned, in the erection of hospitals, or in their management when erected, should obtain and master this new edition of the "Notes." A right direction has been given to the planning and the construction of new buildings for the sick and wounded. What is now specially needed is, that the governors and directors of existing institutions of the kind should be led to take steps for their speedy re-arrangement, if not re-erection; so that the great and unnecessary waste of life that still takes place in them may forthwith be lessened.

PROFESSOR SMIRKE ON ARCHITECTURE AS A FINE ART.*

OTHER more suitable occasions may present themselves for a detailed comparison of the two styles referred to in the previous portion; but there is one point of distinction so broad, and so unquestionable, that I cannot refrain from here adverting to it,—I mean the subordination of horizontal lines to vertical lines in Pointed architecture, and of vertical to horizontal lines in Classic architecture. If we regard the latter in its whole range, from the primæval efforts of Egypt down to the latest vagaries of the Borromini school, we find horizontal lines always *dominant:* the entablature in some shape is scarcely ever wanting; cornice, coping, balustrade, string-courses, all have a horizontal tendency; and when vertical lines are resorted to, there appears to be a perpetual eagerness, as it were, to interrupt their continuity. Whilst, when we turn to Mediæval architecture, from its earliest distinct development to its final extinction, a never-failing tendency to vertical lines and upward extension is manifest. When a constructive necessity occurs for a horizontal feature, it is kept insignificant by faint projection and frequent interruption,—*height*, in fact, appears to have been the *dominant thought* of all Mediæval architects.

This striking and fundamental distinction is the chief cause of that impassable line of separation which now exists between these two great systems of design, each so beautiful, yet so different.

I should be ill expressing my own feelings if I were not to urge on you a close, diligent study of both these styles: for both are alike deserving of our attention. The younger style we may pronounce, as compared with the elder, perhaps, more free and picturesque; more plastic and manageable; more varied and copious in its details; more intimately associated with our history; and in ecclesiastical structures the habits of four or five centuries have interwoven it with our religious feelings. On the other hand, the elder style we may regard as more symmetrical, more grand and severe, more refined and polished, whilst in some of its later phases it is more applicable to festive and cheerful purposes.

The great aim and object of all style, as such, is to produce certain forcible impressions on the mind, which impressions are usually classed under the two leading heads of the *sublime* and the *beautiful*. I shall *not* launch out into any metaphysical inquiry on the nature and sources of these two wide topics. The field of inquiry has been so often and so ably trodden, that it would be difficult to gather any new flowers in such a search. The subject has been amply discussed; from Longinus down to Alison, the sublime and beautiful have been favourite topics with the highest intellects and the profoundest thinkers.

To such sources then (if you should have the curiosity to pursue an inquiry from which I cannot promise you very much fruit) I would refer you for the study of the two great instruments by which our art is supposed to acquire its power to affect the spectator's mind.

I hope, however, it may not be held pre-

* See p. 38, ante.

sumptuous in me to say that amidst the profusion of written learning lavished on these topics, not a few fallacies may occasionally be encountered; you must, therefore, read with thought and attention, remembering that what is *well* said, is not always *truly* said. Thus, Alison, too eager to prove his favourite dogma, that there is no such thing as inherent beauty in any object, will advance opinions to which all the refinement of his polished pen will scarcely avail to command our assent. He states, for example, that "what we call beauty in colour is not due to any original or independent beauty in the colours themselves, but to associations we connect with them."

He tells us, too, that "no forms or species of forms are of themselves originally beautiful; but that their beauty, in *all* cases, arises from their being expressive to us of some pleasing or affecting qualities." Against this theory we have but to set up the very opposite theory of another writer, that great and original genius, Hogarth, whose whole book is devoted to prove the inherent beauty of one particular line—the *one*, curvilinear, *line of beauty!* As if the sources of beauty were not endless! As if a *line* had an intrinsic beauty independent of the use to which it was applied, or the nature of the object of which it forms the external boundary!

With no greater violation of truth we might attempt to define *the hue* of beauty in painting, or *the note* of beauty in music. Again, it is a prevalent and plausible theory that the true beauty of an object consists solely in its fitness for the purposes for which it is destined. I readily admit that *unfitness* for its purpose is a fundamental defect to which nothing ever can or ought to reconcile us. But to urge that utility is *all* that is required to impress us with a sense of beauty would surely be going too far. In nature, the mother and mistress of all arts, there are many illustrations to which I might appeal. The *legs* of a peacock, for instance, are surely more directly useful than its *tail*; but how unseemly are they, when compared with that gorgeous appendage. No doubt, there is great beauty in the fitness of the leg for its purpose; but there is a beauty in its *plumage*—of another kind, it is true—yet I conceive even more effective in producing lively pleasure in those who contemplate it. The beauty of the leg speaks rather to our reason than to our feelings, whilst that of its plumage needs no exercise of reason to command our admiration. It is that *latter* kind of beauty which the Germans, borrowing from Greek sources, have taught us to call *æsthetic*, and which, I think, needs your chief study, for it is a kind of beauty far more difficult to understand, or define, or hold in our intellectual grasp. The beauty of *fitness* may be measured and weighed by the easy standard of common sense; the other, more subtle, more immaterial, may be perceived and yet not measured or even explained. Like a wreath of mist, the rainbow, the mirage, or the northern aurora, it is a reality; it is there, before us, in a thousand forms of loveliness; yet the vision eludes that closer scrutiny we desire, and refuses to submit to the test of a stricter investigation.

Unfortunately for the teacher of art, it is far more easy to say what is beautiful, than to say wherein that beauty consists.

A sense of what is beautiful in the *physical* world operates like the conscience in the *moral* world; which impels or deters, often, without the intervention of reason. We often, perhaps indeed *usually*, perceive what is morally right or wrong at once and without any process of examination. So the recognition of beauty is an intuitive result, at which we ought to be able to arrive before we have formed any definitive idea of the cause, or have sought to investigate the motives upon which our judgment is founded.

A true student, however, will not rest satisfied with this vague impression, but will endeavour to search out its causes; and whatever may have been the errors into which men of genius may have been misled by their confident reliance on some favourite theory, the student should be thankful for the hints which philosophic inquirers have afforded to aid him in his search.

It is, of course, an essential part of the task of a lecturer on our art to bring before your notice examples of the highest qualities of the art, practically presented to us in the masterpieces which time has spared. Our art may boast a proud pre-eminence among the sister arts, in its *capacity* to present such examples. In addition to the durability of its monuments, it has been truly said of Architecture that she alone is able to excite emotions similar to those excited by the contemplation of the great works of nature. If such be true, it is indeed a very noble incentive to genius that it should be permitted to the architect so to distribute and deal with mere inert matter,—with fragments of rock or pieces of burnt clay,—and so to pile them up as to make them the source of a high intellectual pleasure, and even to strike us with awe and astonishment.

Besides the two primary qualities of sublimity and beauty, a claim has been set up for a third attribute, or quality, as worthy to be classed with them, and as forming one of the great aims of art; though I am by no means satisfied of its claim to be treated on a footing of equality with them. I allude to the *Picturesque*,—a word of modern Italian origin, designating that which is well suited for the painter's art. I believe it was Uvedale Price who first attempted to define distinctly the attributes of the Picturesque, and claim for it an independent position.

Picturesqueness seems to be a term, in OUR art at least, more applicable to a combination of forms than to any one form. A single object, as a cornice or a column, may be said to be beautiful, or even sublime, but it can hardly be said to be *picturesque*. There must, I think, be *variety* of lines, or of tints, or of chiaroscuro, in order to constitute the true picturesque. One of the most eminently picturesque single objects I know is the Pharos at Genoa; but even here the structure itself can scarcely be so designated. It is its *position*, its *substructure*, and its *accessories* which impress it with that peculiar character.

It is this dependence of the picturesque on a happy combination, or grouping, of forms, rather than on the artful design of any one form, which renders it a dangerous object of pursuit with the architect. It can rarely be the result of premeditation; it should come unbidden. Certainly the happiest and most charming instances of this quality of art have been the result of accident. Perhaps the castles of the Middle Ages, especially those of the thirteenth and fourteenth centuries, abound more than any other class of buildings in the ingredients of the picturesque. Which of us, for example, could ascend the long flight of steps leading to the higher and inner gateway of the great castellated monastery of St. Michel, near Avranches, without fancying that some sublime genius, pregnant with all the poetry of architecture, had designed that gate and moulded its scenic turrets with no other object than to fill the spectator with awe? Yet we may be sure that nothing could have been more remote from the mind of those builders than to *make a picture*. The barbican, the keep, the menacing machicolation, the deeply-recessed archway, the varied outline, the broad chiaroscuro, are all features happily incidental to the military wants and exigencies of those times; and yet, who is so utterly and almost necessarily regardless of the picturesque as the engineer?

Even in Domestic architecture, if we examine any highly picturesqre building,—Hadden Hall, for example,—we shall not fail to find that the agreeable effects in which it abounds are by no means the offspring of studied irregularity, or of any *finesse* of art. The embayed window is thrown out just where the *view* invites one; the fireplace projects in bold relief, and its smoke tunnel is carried quaintly off to one side, simply because the ease and comfort of the occupant required that those objects should be placed in those situations. The result *happens* to be highly picturesque, but it is so, as it were, by accident. There is no reason whatever to doubt the ability of the old builders fully to appreciate the effect of all their arrangements, but there was no *straining after that effect*. A bold, almost careless freedom of design, characterized all their work. I need scarcely repeat that a laboured imitation of these happy accidents is sure to lead to failure and disappointment; sometimes, indeed, to the ridiculous.

I do *not* counsel the young practitioner to disregard those superficial arts of design which please the eye; but it should be his chief aim and first consideration so to do his work that each part should answer its purpose thoroughly well; and it is very doubtful whether he can adopt any process better calculated to secure a pleasing result.

Before quitting these general views, I think it incumbent on me to advert to one of the dogmas of our art, the soundness of which is undeniable, but which is attended with some difficulties.

Painting and Sculpture are so fortunate as to have in *nature* a standard of excellence for ever before them, a frequent recurrence to which keeps them on their true course.

But Architecture is less able to draw her inspirations from that pure source: her wants are too artificial; she is too dependent on the requirements of man to enable her to look implicitly up to nature.

But Architecture, still, has a ruling principle, which is *Truth*. From Vitruvius downwards this has ever been taught, although in practice it has often been grievously disregarded.

There is an honest simplicity—a plain manliness—about *truth* which wins our regard, whether in ethics or æsthetics. But whilst we recognize truthfulness as a cardinal virtue in our art, as well as in morals, we must take care not to allow that analogy to carry us too far.

We often meet in the practice of out art with necessities utterly inconsistent with beauty. Hard lines, unsightly angles, heavy, graceless forms, imposed on us by structural requirements; it would be a mischievous error to suppose that, because in our social conduct there should be no deception nor concealment whatever, we are therefore bound to expose to view these mechanical deformities from which we cannot escape; whilst, to depart from the form that is mechanically the *right* form, only to make it more agreeable to the eye, would be a still graver error. That there should be a politic concealment sometimes studiously resorted to, some ingenious art practised occasionally,—such, for example, as the concealed buttresses and the hidden ties and props common in our old buildings,—seems therefore to be an unavoidable condition of our calling. In the most naturalesque schools, nature is not, and never has been, copied with a stern adherence to exact truth. The simplest leaf requires *treatment* to fit it for the purpose of decoration, and treatment implies some modification or humouring of form or of colour; in short, *some* departure from nature, and consequently from truth. Nearly allied to this is another principle of our art, which, although by no means universally acted upon, yet justly claims our most respectful submission. We should have a care how we introduce into our design anything which does not serve *some* good *purpose*. I do not mean that mere *utility* would justify a *deformity*, nor do I mean that every architectural feature in our design should be a structural necessity; but that, although it may not be to add strength or to afford support, it should at least have its appropriate *purpose*; a valid reason should be assignable for it; some good end must be sought to be attained by it; some offensive angle or feature to be removed; some unsightly blank to be relieved; some monotony of line to be broken; some needed light or shadow to be introduced; some discord in form or colour to be allayed.

Doubtless it is a maxim worthy of all acceptation that utility is one of the most important elements of beauty; yet those who recognize architecture as a *fine* art will admit that simple, bare utility is not the sole aim of our art. This qualification of the really valuable and important principle of usefulness will, I fear, scarcely meet with *general* sympathy: the utilitarian current sets in so strongly in some minds that it well nigh carries all other considerations before it. It is enough to say that neither painting nor poetry, nor music, nor letters, nor any of the arts which embellish life, can lean for support on that class of intellect which refuses to assign to them a footing within the domain of social usefulness.

With all respect for so inestimable a guide in the common business of life as *utility*, I will venture to encourage you by pointing out to you the prodigal munificence which has arrayed the lily of the field, which neither toils nor spins, in a raiment of surpassing glory; which has given to the birds of the air not merely their needful feathers but a plumage of infinite beauty; has lavished on the shell-fish of the deep seas tints which no art can reproduce; and the *pearl*, which princes are proud to wear. Nay, *Virtue* itself has found a fit companion in the *beauty of the human form*.

"*Gratior pulchro veniens in corpore Virtus.*"

Why, then, should Architecture be forbidden to indulge, moderately and wisely, in some *graceful inutilities?*

It is the fear of excess and abuse that alone renders this indulgence dangerous; and to arm the student against such danger is one of the foremost duties of the art-teacher.

Truthfulness and usefulness must indeed be taken as our guides in the highway along which we may travel unwarily and without danger. It is when we diverge into the by-paths and inviting lanes of mere æstheticism that we most need to be on our guard against failure.

I have now detained you quite long enough on these general views. Our art is a peculiarly practical one, and needs to be dealt with in details rather than in generalities. I shall, therefore, now close my present discourse, by addressing to the architectural student a few parting words.

You are set out on a pilgrimage which will need much preparation, and a large fund of enthusiasm to cheer you on your way. Set out on it with a conviction that an abundant store of knowledge is the best provision you can make for the journey.

Besides obtaining a thorough mastery over your own art, cultivate an acquaintance with the sister arts. It will be wholesome to bear in your memory the very intimate relation which subsists between *all* the departments of high art, which find their home within these walls. Together they will ever flourish or decay: each needs the aid of the other. It is for Architecture to build the sanctuary; it is for Painting and sculpture to spread out their treasures for its perfection. It is for *them* to give life to its inanimate walls, by peopling them with the story of past times, by refreshing us with the charms of natural scenery, and by making them the depositories of those memorials which link the living with the dead.

Above all things, in your pilgrimage, be especially anxious to dismiss and discard for ever from your minds all petty feelings of personal jealousy.

Pull at no man's skirt: outrun him, if you can, in the race of honourable rivalry; but depend upon it your progress will be impeded—not promoted, by the indulgence of professional jealousy or censorious criticism.

Let not your spirit be weighed down, nor your course turned aside, by any such sinister, unworthy objects. The rivalry in *labour* is the best, and only useful rivalry. You will find the buoyancy of self-reliance wonderfully assisted by that lightness of heart and cheerfulness of spirit which never fail to accompany an habitual goodwill towards others.*

THE LATE MR. JOSEPH WOODS, ARCHITECT.

THE death of Mr. Woods, to which we referred in our last, took place when he was seated in the easy chair of his study: he died, as he had lived, calmly. This estimable gentleman was born at Stoke Newington, on the 24th of August, 1776, and was the second son of Mr. Joseph Woods and Margaret his wife, daughter of Mr. Samuel Hoare, whose son Samuel became the senior partner in the banking-house of Hoare, Barnett, & Co., Lombard-street. His father, although engaged in commercial pursuits, was a gentleman of high attainments, and a frequent contributor to the pages of various literary publications, both in Latin and English prose and verse. In the days of Mr. Joseph Woods's childhood, to use his own words, "there was a great deficiency of good schools among the Society of Friends, to which my parents belonged, and one year passed in attendance on a day-school in London, kept by a Mr. Lord, was the only efficient schooling I had." He was, therefore, in great measure a self-educated man. He entered upon a business life as a pupil of Mr. Alexander, a well-known architect of that day. About three years after he commenced the practice of this profession on his own account. He was one of the first institutors, if not the first president, of the London Architectural Society, founded in 1806, and contributed valuable papers and essays on kindred subjects, to the meetings of this Society, concerning which we gave some information not long ago. His health proving insufficient for the drudgery of his profession, and being possessed of means, which enabled him to act independently, he indulged his artistic taste and talent by a residence of some years abroad. Of this period it was said in our pages by Professor Donaldson, "It is charming to see my old friend Joseph Woods, seated in his study finishing up some of his Grecian studies made above forty years ago, and discoursing of arts and artists with grace and vivacity, and of reminiscences when we were together at Rome, and were meeting Canova, Camucini, Thorwaldsen, and like men of mark there, with John Soane, jun., Basevi, Bond, Saunders, George Rennie the sculptor, and other such, now passed away. Hardwick and myself used to go to his rooms, and we read Goldoni and Alfieri together, and battled it out on many questions of taste regarding Greek and Roman architecture."

The results of his foreign labours were given to the public in a book well known as "Letters of an Architect from France, Italy, and Greece," 2 vols. 4to. 1828, as well as in the editorship of the third volume of Stuart's Athens.

Mr. Woods was himself an artist of no mean pretensions, more to be valued as a faithful and accurate delineator than as exhibiting an imaginative mind. His style of colouring may be considered generally as too cold, but he was occasionally warmed up by his subject, and especially so in later years. It has been one of his amusements to finish off, and present to his friends his sketches of olden date.

Mr. Woods was an old member of the Geological, Antiquarian, and Linnæan Societies, and was best known, perhaps, to the members of the last-named society as a botanist of high European reputation. His tenacious memory, persevering habits, and fondness for country rambles, qualified him for his favourite pursuit—botany. His scattered contributions and numerous discoveries in this branch of science are of high value. His "Tourist's Flora," published in 1850, has proved an almost indispensable companion to every botanist, and his name will be perpetuated to posterity by the very rare and beautiful little ferns *Woodsia hyperborea* and *ilvensis*, a very distinct genus named by Mr. Robert Brown, many years president of the Linnæan Society, London. Mr. Woods, up to the day of his decease, was steadily engaged in the preparation of a second and enlarged edition of this work.

Although during his long life a bachelor, his domestic qualities were highly appreciated by both old and young, who had the privilege of his intimacy. Possessed of a sound judgment and a large stock of common sense, he was a constant friend and valuable adviser, but his character, partly no doubt from his feeble state of health, was too unobtrusive and retiring to bring him into that contact with the literary and scientific world to which his talents entitled him. On several occasions he gave our pages the benefit of his varied knowledge. They who knew him best loved him most.

* The second and third lectures delivered by the Professor were reported in our pages on a previous occasion, so that it is not necessary now to give them.

THE LATE MR. CHARLES M'INTOSH, LANDSCAPE GARDENER.

MR. CHARLES M'INTOSH, whose death we mentioned last week, was born at Abercairney, in Perthshire, where his father was gardener to Mr. Moray. He was educated at Maderty, at the school conducted by Dr. Malcolm. He preferred gardening to theology; and after some time spent in the garden at Abercairney with his father, left for a position in the gardens at Taymouth Castle, the seat of the Marquis of Breadalbane. While still a young man he went to seek his fortune in the south; and spent some time in Hampshire, London, and elsewhere, making fast and influential friends wherever he went. It was to Mr. M'Intosh, acting under the directions of Mr. Horner, that the Londoners are indebted for the gardens of the Colosseum. The intelligence and taste of Mr. M'Intosh recommended him to the notice of the King of the Belgians, who was at that time resident at Claremont, and by his majesty he was appointed curator of the Royal Gardens there, and afterwards of those at Brussels. Her Majesty the Queen permitted him to dedicate to her his work, "The Book of the Garden."

In 1838, Mr. M'Intosh returned to Scotland to take the management of the Duke of Buccleuch's gardens at Dalkeith. After a period of nearly twenty years spent as head gardener to the duke, Mr. M'Intosh resigned his appointment to become a landscape gardener or garden architect on his own account; since which time he has been engaged in beautifying the residences of many citizens, and the gardens and parks of many of the gentry and nobility of the country.

Besides his "Book of the Garden," Mr. M'Intosh at an earlier period of life wrote the "Practical Gardener," published in two volumes, and of which he saw three editions through the press before he sold the copyright; "The Greenhouse," "The Orchard," "Flora and Pomona," "The Year Book," in connexion with Dr. Lindley Kemp, and "The Disease of the Larch." He was a frequent contributor to many gardening periodicals besides; and in particular to the *Gardeners' Magazine* and *Paxton's Magazine of Botany*. He was also, along with Dr. Lindley, one of the founders of the *Gardeners' Chronicle*. Many friends deplore his loss.

THE LATE MR. CASEBOURNE, C.E.

MR. THOMAS CASEBOURNE, whose death occurred on the 2nd inst., was a native of Hemel Hempstead, Herts, and was born in 1797. In early life he devoted himself to engineering pursuits, and was a favourite pupil of Telford, the designer of the Menai Suspension Bridge and the Caledonian Canal. Mr. Casebourne was one of the oldest surviving members of the Institution of Civil Engineers, having been admitted an Associate in 1828, and a full member in 1837. He was privileged to assist Mr. Telford in several of his works, and subsequently, amongst other duties, he was engaged in the Lincolnshire Fens Drainage, the London and Liverpool Road, the Metropolitan Water Survey, &c. From 1833, and for twelve years subsequently, Mr. C. was engaged on canal works in Ireland, and the extensive canal connecting Lough Neagh and Lough Erne was constructed under his superintendence. In 1845 Mr. Casebourne removed to the locality now so well known as West Hartlepool—then a mere hamlet—to undertake the Resident Engineership of the West Hartlepool Harbour and Docks; and since that period his name has been intimately connected with all that related to the port, harbour, and town of West Hartlepool. On the incorporation of the Commissioners in 1854, Mr. C. was one of the original commissioners appointed by the Town Improvement Act; and continued to fill the office of commissioner up to his decease. He was for some time chairman of the Board, only resigning that appointment in favour of Mr. R. W. Jackson a week or two before his death. He for a short time represented the West Hartlepool town interest in the Pier and Port Commission; but on the resuscitation of the Refuge Harbour question, retired from that office, so that he might not be said to sit in judgment upon his own amongst other competing plans.

At the West Hartlepool Improvement Board, Mr. Casebourne was a regular attendant. He was also for many years a vice-president and life member of the local Literary and Mechanics' Institute.

ON THE INJURIOUS EFFECTS OF SMOKE ON CERTAIN BUILDING STONES.*

EVERY addition to our knowledge of the causes of decay in stones has a tendency to bring within easier reach the appropriate remedy. At all events, a more comprehensive knowledge of the causes of decay in stones will help us to discriminate with more certainty between good and bad stones, and to avoid the employment of building materials which, although they stand the influence of the weather very well in the open country, or in exposed situations, are nevertheless unfit for particular parts of a building, and cannot be used with safety in some localities. Having been engaged for some time past in examining the characteristic black crusts which are frequently seen on buildings erected of Bath and similar oolitic limestones, my attention was specially directed to the study of the nature of the decay which attacks with great energy some kinds of calcareous stones, and I have come to the conclusion that the injury which the smoke of towns exerts on Bath stone, magnesian limestone, and other calcareous building stones, is far more pernicious in its results than it is generally believed to be. It will, therefore, devolve upon me to direct your attention particularly to the changes which such stones undergo under the influence of a smoky atmosphere, such as we find in most towns.

In common-day life we usually understand by smoke, the black and more or less tangible impure air which rises from the chimneys of fireplaces and furnaces in which the combustion of the fuel is imperfect, in consequence of which some finely-divided carbon and a variety of gases are thrown into the air.

* From a paper read at the Society of Arts, by Dr. Augustus Voelcker, on Wednesday evening last.

That this black smoke exerts an injurious effect on building stones and on vegetation, is admitted in a general way, but I have no hesitation in saying that the extent of the injury done by the smoke that at times obscures the sky in our crowded cities has not been fully recognized. This, perhaps, is the reason why the precise chemical changes which are produced by accumulations of soot on limestones and calcareous sandstones have not been studied with the minuteness which the importance of the subject evidently requires.

Before giving an account of my analytical experiments on the effect of smoke on oolitic limestones, a few general observations on the nature of the decay in stones may not be out of place.

Building stones in general may be divided into two classes:—

1. Stones which, like granite, porphyries, and most sandstones, are not easily acted upon by acids.

2. Stones which, like limestones, dolomites, and some kinds of calcareous sandstones, are composed of materials that are partially or entirely attacked by acids with facility.

Building stones belonging to the second class are much more liable to suffer injury by atmospheric agencies than those belonging to the first class; and as, moreover, limestones and dolomites are principally employed for ornamental buildings, the investigation of the causes which lead to their decay possesses a special interest.

The conditions under which calcareous stones decay when placed in a building, are partially mechanical and partially chemical. The absorption of moisture by porous stones, and the disintegration to which it leads in consequence of the resistless expanding force of water in becoming ice in cold weather, are illustrations of a purely mechanical cause and effect, which frequently manifest themselves in limestones used for building purposes. The changes produced on building stones by carbonic acid and the sulphur compounds in the air of towns, are instances of chemical reactions, which may be seen in their results in some cases as distinctly as the results of purely mechanical force, to which allusion has just been made. Building stones of a loose or irregular structural composition are of course more liable to suffer injury from the absorption of moisture than hard, compact, and crystalline stones of the same or similar composition. The more readily a specimen of Bath or Caen stone is affected by mechanical agencies the more easily it will be found to be acted upon by chemical reagents.

The action of oxygen is of comparatively a subordinate character, its effects confined to constituents which are usually absent or occur only exceptionally, and then in but small quantities of limestones and dolomites. In calcareous sandstones, sulphides of iron and protoxides of iron and manganese occasionally are found, and as these compounds are very prone to absorb oxygen, and the higher oxides thus formed are more voluminous than the original protoxides, such stones are subject to the disintegrating action of atmospheric oxygen. Of far greater importance are the effects of moisture. Water, either in the shape of vapour or liquid, perhaps is the most powerful agent of destruction that displays itself in the gradual crumbling down of calcareous stones. Porous and soft stones of that kind should never be employed for parapets, window-sills, weather-beds of cornices, strings, plinths, or other parts of a building where water may lodge. The changes which water produces in porous stones exposed to drip and alternations of a wet and dry condition, appear to be less of a chemical than a mechanical character.

The expansion which water experiences on sudden alterations in the surrounding atmosphere, and the irresistible force which it then exerts, necessarily exercise a disintegrating action. If the temperature sinks below the freezing-point, this destructive action is most powerful, since water in becoming ice suddenly and greatly expands. But even above the freezing-point, the expansion of water at a sudden elevation of temperature appears to me to exert upon porous building materials a mechanical force sufficiently powerful to account for their gradual decay at seasons of the year when it cannot be referred to the formation of ice within the pores of the stone. There can be no doubt that all stones which possess in a high degree the property of absorbing moisture, are unfit for building purposes. Certain kinds of porous limestones and sandstones, differing widely in composition and in relation to their liability to become attacked by acids, are alike subject to this disintegrating action, thus indicating plainly that their decay is not the result of the chemical action of an atmospheric constituent, but the result of the mechanical action which water exerts on all porous and absorbent materials, no matter what their composition is.

Such stones, it will be readily conceived, must be very liable to crumble down in our moist and changeable climate. In towns, and in the country in sheltered or in exposed parts, on the outside or the inside of buildings, and in short under the most varied conditions, the decay will proceed steadily when it has once begun to show itself in porous and absorbent stones. The fact that these building stones, which decay as readily in open country places as in towns, has led some men to entertain the opinion that the impurities present in the air of towns and in the immediate neighbourhood of manufacturing districts, have nothing to do with the gradual disintegration to which oolitic and other calcareous building stones are subject. But although it is quite true that some building stones do not require to be exposed to the injurious effects of the atmospheric impurities of crowded cities in order to decay, it is no less certain that there are others which stand wind and weather well in the country, but are more or less readily attacked by atmospheric influences when employed in the erection of town residences.

The fact is, the structural composition of some stones is so irregular, and radically bad, and their absorbent powers for moisture so great, that they are alike unfit for the erection of buildings in town or country, whilst there are others possessing sufficiently good physical characters to resist the mechanical effects of water, to which reference has been made, and remain sound in a comparatively speaking pure air, but which are not of such a chemical composition as to be capable of withstanding the pernicious chemical influence of a less pure town atmosphere.

Carbonic acid is a never-failing constituent of the air, and is consequently present also in rain-water. Much stress has been laid on the dissolving action of rain-water on limestones; but it appears to me this action has been greatly overrated. Instead of practical proofs, showing that water charged with carbonic acid really exerts a powerful disintegrating influence upon calcareous stones, merely theoretical reasonings have been advanced in support of that opinion.

It is true, water charged with carbonic acid in contact with carbonate of lime or magnesia gives rise to soluble bicarbonates; but even were the quantity of bicarbonate of lime or magnesia much greater than it actually is, the mere removal of a trifling portion of lime from the surface of the stone does not, I take it, explain the peculiar exfoliation and corroded appearance which many oolitic building stones present to our view. Calcareous stones, exposed to long-continued dissolving action of water containing carbonic acid, exhibit rather a smooth and water-worn but not a corroded appearance.

In the next place we have to consider the effects likely to be produced by the small quantities of nitric acid which are invariably present in the atmosphere. The proportion of nitric acid in the air is so minute that it may be questioned whether these minute traces have any marked influence on our buildings. With respect to the supposed corrosive action of nitric acid of the air, and the formation of nitrates in limestones, I made some experiments, a brief account of which may here find a place. A few years ago my attention was directed to the decay of the oolite limestone of which the lodge at one of the entrances at Badmington is built. This stone was quarried at a place about two miles from Badmington, and, like Bath stone, is not very hard. The stone protected by the porch of the lodge I found in a more advanced state of decay than that freely exposed to wind and weather. * * * *

In the next place the foreign or accidental impurities of the air of towns will have to be considered.

The quantity of sulphur-acids in the air of towns is quite appreciable. The quantity of coals consumed in London for domestic and manufacturing purposes exceeds three million tons per annum, and as all coals contain sulphur, the greater portion of which is discharged during their combustion as sulphurous and other sulphur-acids, an enormous quantity of these destructive acids must find their way into the air. No numerical data exist with regard to the proportion of sulphur-acids in the London atmosphere, but, according to Dr. Angus Smith, the air of Manchester contains an average proportion corresponding to one part of sulphuric acid in every 100,000 parts of air, which in the centre of the town, rises to 25 parts in 100,000. According to the quality of the coal and the amount consumed in a given space in a given locality, the proportion of sulphur-acids in the air of towns will vary. In some places it may, no doubt, be greater, in others less than in the air of Manchester; but under all circumstances it will be sufficiently large to cause serious apprehensions.

The strong affinity of sulphuric acid for lime and magnesia renders it a destructive agent for calcareous building stones. Sulphuric acid not only renders soluble these earthy carbonates, but, forming with lime gypsum, a compound which contains in round numbers 20 per cent. of water of crystallization, and with magnesia the well-known sulphate of magnesia, a salt remarkable for the large proportion of water of crystallization which it fixes, it gives rise to a mechanical destruction of Bath stone and magnesian limestones similar in every respect to that produced by freezing water. The efflorescences of sulphate of magnesia which have been noticed upon those portions of magnesian limestones where exfoliation has taken place, afford a practical proof of the destructive action of the sulphuric acid that occurs in the air of towns. Hydrochloric acid occasionally has been found in the air of towns. It is, however, not a usual impurity; and as on the 1st of January the Act passed in the late session for the more effectual condensation of muriatic acid gas in chemical works has come into actual operation, and there is no practical difficulty in securing the condensation of this gas, no fear need be entertained that the buildings in towns will be affected by hydrochloric acid fumes.

Still more pernicious in its influence than the free sulphur-acids which exist in the air of towns, I have reason to believe, is the black smoke which deposits soot, to the great disfigurement of our public and private buildings. The soot deposit is particularly destructive to the carved portions of buildings. In order to render intelligible the peculiar chemical action which smoke exerts on calcareous building stones, I beg to invite attention to the following analysis of a sample of ordinary house-coal soot, which I made many years ago. In 100 parts of soot I found:—

Moisture	10·620
Organic matter (chiefly black carbon)	44·736
Chloride of ammonium	·933
Sulphate of ammonia	3·580
Chloride of sodium	·231
Chloride of potassium	·503
Oxides of iron and alumina	15·691
Sulphate of lime	11·051
Phosphate of lime	·530
Carbonate of lime	1·129
Lime in a state of silicate	2·290
Magnesia in a state of silicate	·389
Soluble silica	4·014
Insoluble siliceous matters	4·159
	99·856

The proportion of sulphate of ammonia in different samples of soot, I find, varies exceedingly. In some samples I have found as much as ten, twelve, and even more of sulphate of ammonia. Perhaps 5 or 6 per cent. represents better the average quantity of ammonia than the figures in the above analysis. Soot is essentially a mechanical mixture of finely-divided carbon with sulphate of ammonia, some sal-ammonia, and the fine particles of coal-ashes. An inspection of our public buildings shows that it is carried about in the air, and deposited in considerable quantities on buildings, more particularly on the more sheltered parts. Soot, it need hardly be remarked, is a constituent of the smoky atmosphere of towns, and is calculated to do great injury to the ornamental work of buildings executed in Bath stone or magnesian limestone. The most destructive agent of such a smoky atmosphere, as far as calcareous building stones are concerned, I am inclined to think is the sulphate of ammonia, which, as has been shown, is a constant constituent of soot. This conclusion has been forced upon me by the examination of the sooty deposit which was found on a magnificent church in a large commercial and manufacturing town. This church is built of an oolite limestone found in the neighbourhood, and, on account of the increasing decay, which has quite disfigured the structure, and in many places effaced the finer delineations of the carved work, is now under the process of restoration. On some of the older parts of the church the sooty deposits have penetrated the stone to a considerable depth. The stone here appears to be covered with black crusts, varying from half an inch to more than an inch and a half

in depth. These crusts crumble off spontaneously from time to time, or can be easily removed by the application of a slight pressure. I made them the subject of a rigorous analysis, with a view of ascertaining the changes the original building stone evidently had undergone under the influence of a smoky atmosphere, and I was perfectly amazed to find how radically the original composition of the stone had become changed, and was left in no doubt as to the origin of the black crusts.

The stone of which this church is built is a good oolitic limestone, which is composed chiefly of carbonate of lime, with no more sulphate of lime, magnesia, oxide of iron, and insoluble siliceous matters than generally occur in the latter description of oolitic limestones. The following analysis refers to the composition of the uncorroded limestone :—

Water driven off at 212 degrees	·230
Water of combination	·110
Carbonate of lime	97·020
Sulphate of lime	·153
Magnesia	·470
Protoxide of iron	·540
Alumina	·120
Soda	·044
Potash	·296
Insoluble siliceous matter (silica)	1·350
	101·003

In the course of years this stone becomes covered, as has been already stated, with a dark-coloured incrustation, which increases in depth with the time during which buildings are subject to the corroding influence of a smoky atmosphere. The analysis of some of these black crusts has shown me that as much as two-thirds are soluble in water and only one-third insoluble. Dried at 212 degrees, these crusts yielded the following detailed results :—

Portion soluble in water	65·04
Sulphate of lime	51·23
Sulphate of magnesia	1·61
Chloride of sodium	·47
Water of combination	12·63
Portion insoluble in water	34·06
Organic matter (black carbon)	5·72
Oxides of iron of alumina	2·57
Carbonate of magnesia	·10
Carbonate of lime	19·03
Insoluble siliceous matter	6·64
	100·00

A comparison of the composition of these crusts with that of the stone upon which they were found deposited, suggests the following remarks :—

1. The greater part of the carbonate of lime, which is the chief constituent of the stone, has become changed into sulphate of lime.

Sulphate of lime and water of combination are given separately in the preceding analysis, both having been obtained by direct and separate determinations. Uniting the two together, we have no less than 63·86 per cent. of hydrated sulphate of lime in these black crusts, whilst only 19 per cent. of carbonate of lime have escaped transformation into sulphate.

2. Nearly the whole of the magnesia in the crusts is present as sulphate of magnesia, whilst it occurs in the stone as carbonate.

3. The crusts contained in round numbers 5¾ per cent. of black carbon, showing that a large proportion of soot must have come in actual contact with the surface of the stone.

4. Both the amount of oxides of iron and insoluble siliceous matters in the black deposit is very much greater than the original stone. An examination of the insoluble siliceous matter has shown me that it is of the same nature as the siliceous matter of coal-ashes. The fine particles of coal-ashes, it thus appears, are carried along with the carbon and other constituents of soot not deposited on the more sheltered portions of buildings. It has been shown before that house-coal soot contains a considerable proportion of oxides of iron, and alumina and insoluble siliceous matters in the shape of fine coal-ashes. The occurrence of fine coal-ashes in the black crusts thus shows that soot, of the same general character as house-coal soot, has been deposited on the stone.

In soot the amount of sulphate of ammonia is considerable, and as the black deposit on the stone shows plainly the presence of other soot constituents, sulphate of ammonia might likewise be expected if this salt did not act upon carbonate of lime in the presence of moisture. I have examined several specimens of deposits on calcareous stones, but in no case could I find more than mere traces of ammonia. The sulphate of ammonia in the sooty deposit in contact with water and the calcareous stone evidently has become transformed into the volatile carbonate of ammonia which escaped, and the sulphate of lime which remained behind. There can be but little doubt that such a chemical reaction takes place when a smoky atmosphere comes into contact with a calcareous stone, especially if the stone is porous, non-crystalline, and exposed to damp. I have frequently noticed that the dampest and most sooty and less-exposed parts of buildings are much more subject to decay than the more exposed parts. Now this could not be the case if gaseous constituents of the air were the chief cause of decay, which proceeds with such rapidity in limestone buildings; for if this were so, I imagine the most exposed parts of such buildings could be more easily attacked than the less exposed. But if the corroding action of the air of towns is, as I believe, more properly referred to the tangible portions of soot, it admits of a ready explanation why exactly the sheltered and damper portions of a building are more liable to decay than other parts. In the first place, it may be observed, soot will be more abundantly deposited in the crevices of fine ornamental stonework, or in places sheltered by protruding cornices, than on a plain surface wall, freely exposed to wind and weather; in the next place, it has to be borne in mind that, according to one of the first laws in chemistry, chemical reactions do not generally take place except the materials which act one upon another, or at least one of them, are presented to each other in a liquid state.

In a dry atmosphere, the deposition of soot on Bath stone would not, I imagine, produce any injurious effect; on the other hand, in a damp place, the sulphate of ammonia contained in soot will be dissolved by degrees, and then act upon the limestone, producing by double decomposition sulphate of lime and carbonate of ammonia. In a damp and sheltered position, the conditions for the gradual solution and decomposing action of sulphate of ammonia are evidently more favourable than they are in a more exposed part of a building, where rain will wash away the sulphate of ammonia of soot before it has time to act upon the stone, and the wind in a great measure prevents altogether large accumulations of soot.

The sulphate of lime produced by the action of sulphate of ammonia upon limestones in the presence of moisture, it is hardly necessary to observe, takes up water of crystallization, and thereby leads to the exfoliation of the stone. The longer the action of a sooty atmosphere continues upon limestones, the more complete will be their decomposition. In old and thick crusts, like those examined by me, we have seen that more than 60 per cent. of gypsum may occur. Had I merely analysed the surface of the crusts, I doubt not a still larger proportion of sulphate of lime would have been found.

In another specimen of a black limestone deposit from a public building, I found :—

Hygroscopic water	1·07
Organic matters (chiefly fine carbon)	5·29
Hydrated sulphate of lime	56·10
Carbonate of lime, oxides of iron, alumina, etc. (determined by difference)	34·11
Insoluble siliceous matter	3·43
	100·00

The proportion of ammonia in this incrustation amounted to only ·04 per cent., and that of nitric acid to ·115, which is equal to ·174 of nitrate of lime. Here, again, it will be noticed that the sulphate of ammonia of the soot has almost entirely disappeared, and that it has given rise to no less than 56 per cent. of hydrated sulphate of lime, by acting upon the surface of an oolitic limestone.

The effect of a smoky atmosphere on Caen stone is very injurious, particularly if the Caen stone is porous and hygroscopic. I have lately had an opportunity of noticing the rapid decay of Caen stone employed in the restoration of a church. The decay showed itself in less than three years, and was proceeding with such rapidity that Caen stone had to be abandoned in the work of restoration.

Specimens of this Caen stone, and incrustations formed upon it under the influence of the smoky atmosphere of a large manufacturing town, are placed on the table; also specimens of the stone which is now employed, and which resists better the injurious action of such an atmosphere.

The analysis of the crusts and Caen stone yielded the following results :—

Hygroscopic water	1·56
Organic matters (carbon chiefly)	4·54
Hydrated sulphate of lime	41·78
Carbonate of lime	39·98
Carbonate of magnesia	·58
Oxides of iron and alumina	·33
Insoluble siliceous matter	11·01
Alkalies and loss	1·27
	100·00

The amount of alumina in the deposit was only ·038. A nitric acid determination gave ·246 per cent., which is equal to ·371 of nitrate of lime.

Although this deposit was of comparatively recent production, it nevertheless contained a large proportion of hydrated sulphate of lime. Hard crystalline limestones, of course, resist the action of smoke better than porous soft stones; but it may be questioned whether any description of limestone is well adapted for delicate ornamental out-door work in a smoky town. If the evil of a smoky atmosphere cannot be entirely avoided in places like London, Manchester, Birmingham, &c., every care should at least be taken to mitigate as much as possible the smoke nuisance.

THE SHAKSPEARE CELEBRATION.

THE adjourned meeting of the general committee was held on Monday, his Grace the Archbishop of Dublin in the chair. Mr. Hepworth Dixon having reported fresh facts, and stated what the council desired,

Mr. Westland Marston read the following report of the special committee appointed to draw up an address to the public :—

"The National Shakspeare Committee having appointed us a special committee to prepare a public address, we beg to state that, in the absence of any report from the committee which have been appointed to consider the questions of a form and site of a memorial in honour of Shakspeare, your committee feel it would be premature to submit any address for public circulation. We beg to report for the information of the national committee that the following suggestions have met with the approval of the special committee :—

1. That a memorial be erected in London which shall afford scope for the illustration of Shakspeare's works by architects, painters, and sculptors.

2. The adoption of measures to secure a public holiday throughout the kingdom on Saturday, the 23rd of April next.

3. A performance on the same day at the Theatre Royal, Covent Garden, of music composed of the poetry of Shakspeare.

4. An arrangement, if practicable, for one or more performances, dramatic or musical, from Shakspeare's works, to commence on the 23rd of April next, such performances being in addition to those which have been already promised in aid of the fund by most of the principal London managers.

5. A public dinner on the 23rd of April next.

(Signed) ROBT. VAUGHAN (Chairman). WESTLAND MARSTON. TOM TAYLOR. F. G. TOMLINS. HENRY BARNETT. SHIRLEY BROOKS. THEODORE MARTIN. W. H. DIXON."

On the motion of Mr. Deputy Read, seconded by Mr. Jonas Levy, the report was received.

On the motion of Mr. E. H. Lawrence, seconded by Mr. Godwin, it was resolved that it was desirable to raise about 30,000*l.* by public subscription for a Shakspeare memorial. An amendment was proposed to the effect that the naming of any sum was premature; but the majority present agreed with the council, that the public would desire to know something like what the views of the committee were in this respect, and, moreover, that some idea as to the amount available must be given to artists before designs could be obtained.

The Monument Committee will now doubtless meet immediately and determine the mode to be adopted to obtain a worthy design for the desired monument. The want of certainty as to the provision of funds will be a hinderance.

Amongst the suggestions as to site, Mr. Leighton names Primrose Hill, with a new avenue across the Regent's Park, connecting Portland-place with the Finchley-road, and passing the proposed site.

This is too far away for us. We want the memorial to be where every one visiting London must see it without going out to look for it, and that it should aid in the adornment of a frequented part of the metropolis.

The site we suggested, part of the Green Park opening on to Piccadilly, has pleased many persons. Such a memorial erected there as would, in the words of the special committee's report,—"afford scope for the illustration of Shakspeare's works by architects, painters, and sculptors," would add a feature to the metropolis in which the whole kingdom would have an interest, and might be made to show the world the estimation in which we hold our Shakspeare.

Since this was written, we have observed, with equal regret and surprise, that the mover and seconder of the amendment, Mr. Tom Taylor and Mr. Shirley Brooks, with seven of their supporters, have withdrawn from the committee, and published a letter, giving, as the chief reason for doing so, the resolution come to to mention to the public the amount thought to be desirable. In the case of the mover, Mr. Tom Taylor, it must be viewed as the only reason, as

he had but just then joined the committee. We hold the gentlemen who have withdrawn in great esteem personally, but we must be permitted to say, the course they have taken is not one we should have expected from them. We are not bound to defend the executive committee: a great deal of time has been wasted, and some want of wisdom shown. Had the gentlemen in question withdrawn from active co-operation on those grounds, little wonder might have been expressed; but that they should only just now have come into work, condoning, as it were, any previous objections, and then immediately withdraw because they were in a minority on a division,—because a large majority of the general committee (not the *executive* committee) differed from them on a mere question of judgment, should a sum be named or not?—is, as we have already said, not what might have been expected from them. They would surely have done better for the cause they doubtless have at heart, if they had remained to assist in giving a right direction to the movement. There is no question whatever, that delay has placed great difficulties in the way of the committee; but these difficulties may yet be surmounted, if all who really desire to see the 300th birthday of our great poet properly celebrated in the metropolis, and a worthy artistic memorial there initiated, will give frank and loyal aid to the work.

At Stratford, the arrangements for a glorious celebration are making very satisfactory progress, and there, too, it is proposed to raise a monument. This is regrettable, as it will tend to lessen the amount obtainable for the National Memorial. More than 3,000*l.* have been already subscribed, we are told: and the Rev. J. M. Bellew, who is working on both committees, has issued a programme for Stratford that will doubtless take many there for a gay week. The temporary theatre, 100 feet across, is nearly ready for the roof. It is proposed to decorate it in the style of Shakspeare's period.

THE CAREER OF PAINTING AND SCULPTURE.

LIVERPOOL ARCHITECTURAL SOCIETY.

AT a meeting of this society, on the 13th inst., Mr. Huggins read "A Review of the Career of Painting and Sculpture in all Ages: tracing the birth, affiliation, and mutual influences of their consecutive and contemporaneous schools, and their historical relations to the styles of architecture." It was to have been illustrated by a coloured chart, designed as a complement to his "Chart of Architecture," but circumstances had caused the postponement of its exhibition to the meeting for a short time. After replying to a criticism of his previous work, he proceeded to the subject of painting among the Egyptians, which was less scientific, and in many important respects inferior to sculpture. In fact, the art of painting, properly so called, did not exist among the Egyptians, and little more could be said in reference to the arts of the Assyrians and Babylonians. After tracing the art of the Etruscans, he proceeded to that of the Greeks, which he believed did not arise till after the first settlement of Greek colonies in Asia Minor. He traced the various improvements introduced into painting by the succession of great masters from Polygnotus downwards, through the several periods of the Greek schools, to the time of Apelles, the most celebrated and excellent painter of antiquity. He traced the art among the Romans, where, he remarked, it found a very different soil from that in which it had flourished in Greece; and from the Roman he went on to the early Christian style, which, he said, was but ancient art re-animated by the new spirit which the new religion supplied, and which had received its birth and spent its earliest infancy in the catacombs of Rome, where the first Christian artists had given utterance at once to their artistic and religious feelings on the walls of their subterranean chapels and tombs. Out of the early Christian style rose the Byzantine and Longobardian, the decaying forms of which he traced through the Middle Ages, till their amalgamation in the twelfth and thirteenth centuries gave rise to the great schools of Italy. It had been often supposed, that during the dark ages all art, with all literature, was lost sight of amid the desolation and confusion that everywhere prevailed. But this was not the case. There was throughout the darkest of the dark ages a faint twilight. Some few sparks of that art of Christianity which had been born and nurtured in the catacombs, monks and bishops preserved and kept alive till they were ultimately rekindled in the thirteenth century into the living flame, which though ages ago culminating, still burnt brightly at the present hour. Mr. Huggins described the rise of the various Italian schools, beginning with the schools of Sienna, Pisa, and Florence, which latter was considered the mother of all the rest. No school was so rich in great masters of design as the Florentine, and in the history of this school alone would be included an account of almost every step of invention and improvement that had taken place in modern art. From the Florentine he went to the Umbrian, which gave birth to the Roman, of which Raffaelle was the head and greatest ornament. The Florentine and Roman schools were rather consecutive than contemporary and rival schools. The Florentine school, which was the general mother of all the rest of the schools of modern Europe, was more especially the mother of the Roman, for she jointly contributed, along with the Umbrian, to the formation of Raffaelle, the founder of the Roman school. All her great masters of design, Giotto, Masaccio, Da Vinci, Bartolomeo, Michelangelo, contributed to the education of that prince of painters, and when this was accomplished her occupation seemed well-nigh gone; for, excepting those formed in the school of the Caracci at Bologna, all the great painters in design and expression after the time of Raffaelle were of the Roman school. He traced the development of the various other schools of Italy and Western Europe—Venetian, Bolognese, Paduan, Parmese, Neapolitan, German, Flemish, Dutch, Spanish, Eclectic, Naturalistic, French, and finally the English, which was the last school founded in Europe. Though the stream of Italian and European art had thus been traced from the art of the ancients, yet painting and sculpture had undergone in their course an entire change, both in their form and spirit; and the chief regenerating influence upon them had been the new religion of Christianity, which was of another nature and spirit from its fallen rival.

CALAHORRA, SPAIN.

CALAHORRA is a quiet little city of Old Castile, situate on a rocky eminence by the side of a confluent of the Ebro,—dried up when I saw it, its course being marked by a bed of sand. Calahorra is an old Roman city, its ancient name being *Calagurris*, and there still exist the ruins of an aqueduct at some distance from the town, and a promenade has been laid out on what was I believe the hippodrome. In the "plaza" (French, *place*) of the town there is a rude painting of a woman on a pillar, holding a sword in one hand, and an arm, meant to be bloody, in the other; these form the city arms, having been adopted in consequence of the Iberian mothers, during the seige by the Romans, having eaten their own children rather than submit. The small cathedral has several points of interest. There is no tower worth speaking of, the "cimborio" at the intersection being low, though not ungraceful. The north transept door is finely sculptured in the Plateresque style of the fifteenth century, but the arches and pillars with which it is adorned are stuck about as if in defiance of architectural propriety. The nave is Gothic, the groining tolerably good, but the transepts and choir are in a very late and debased Renaissance. The chapels are, as usual, of various dates; one of them contains a magnificent marble "retablo" of the best Plateresque period, sculptured with most delicate cinquecento arabesques, and adorned with several well-carved figures, somewhat disfigured, however, by gilt frippery of a later date. Another has a very ancient picture of the patron saints of Calahorra, San Emeterio and San Celedonio, whose history is depicted more at length in a third. It is said that the heads of these saints, being thrown into the Ebro, made the tour of Spain, and came ashore at Santander, while their bodies stayed peaceably at Calahorra till the Moors took it, when they walked themselves off to the mountains, whence they were brought back in the fourteenth century. The stalls are good, but plain; the "trascoro" or screen surrounding it, a mass of niches, columns, statues, &c., completely covered with gilding, quite disfigures the nave.

In the sacristy I quite unexpectedly found some very good pictures. I had expected to find but one—a "Saint Margaret," of Titian's—but found also a copy of Rubens's "Brazen Serpent," the original of which is at Madrid (whether the copy is by himself or not I cannot tell); an "Agony in the Garden," very old, the face of our Saviour most beautiful in its expression; a "Saint Thomas putting his Finger into the Side of Our Lord;" a "Mater Dolorosa;" and a "Christ on the Cross," all of them pictures of considerable merit. There are also two half-length saints, very good; a large canvas of "The Decapitation of the Patron Saints of Calahorra;" a "Judith with the Head of Holofernes," also very good; and a "San Sebastian," the worst thing about which is the head of the saint. There is also a series of large canvases of considerable merit, representing "The Judgment of Solomon," "The Head of Naboth brought to Jezebel" (this is the only painting of the subject I have ever seen), an Annunciation, Visitation, Adoration of the Angels and of the Shepherds, &c.; and another series of small paintings on copper, representing scenes in the Passion of Jesus Christ, which last appear to be of the school of Bayeu, who, except Goya, was the last painter of any merit Spain can boast. The "Saint Margaret" is very fine; the people at Calahorra insist that it is the original of that at Madrid.

It is always very difficult to arrive at the names of the artists who painted the numerous pictures in the Spanish churches: with the exception of perhaps a Titian, Rubens, or Murillo, no one on the spot seems to know anything about them. As Calahorra is not much visited, the priests seemed quite pleased at my intrusion into the sacristy, and asking me if I were a connoisseur, "*Es Usted un intelligente*," began to point out what they considered the wonders of the place. The houses here are very substantially built, being of stone, inclosed, as it were, in a frame of brick bands and piers, forming a substantial whole, very different from the houses of Bilbao or Madrid, where, however paradoxical it may appear, the roofs are put on before the walls are built; for the ground-floor being first built of stone, an erection of wooden posts, with brackets supporting beams, which in their turn sustain the joists, is carried up to a height of four or five stories; then the tiles are placed on the roof; and lastly, the spaces between the wooden posts are filled up with brickwork, leaving apertures for windows and doors. This latter mode of building has long been the fashion in certain parts of Spain, as I find it alluded to as if in general use in one of the comedies of Alarcon, who wrote, I believe, in the early part of the seventeenth century. The bricks made about Calahorra, and, indeed, throughout the whole of that part of Castile which lies along the Ebro, and is called La Rioja, and throughout Arragon, are very good: their colour is almost that of yellow ochre, considerably darker than our white, or, rather, yellow bricks. The form of the Spanish brick approaches that of the Roman, being about 11 inches by 6 inches, and 1¼ inch thick. English bricks are, however, coming into use, at least in the Basque Provinces.

W. N. L.

MR. VIGNOLES'S ADDRESS ON CIVIL ENGINEERING.

DUBLIN INSTITUTION OF CIVIL ENGINEERS.

ON the 13th inst., an ordinary meeting of this society was held in the Museum Buildings, Trinity College, when Mr. Vignoles, F.R.S., the president, delivered the opening address.

In the course of it, Mr. Vignoles said it gave him much pleasure to learn that the institution had now been established on a principle which enabled them to include the members of cognate professions, viz., architects and manufacturers connected, directly or indirectly, with engineering. At an early period of the history of engineering, architects and engineers were interchangeable terms: and, even in his own recollection, there were often struggles between architects and engineers as to who are to be the proper builders of bridges. In the late competition for bridges in London, some of the finest designs, as far as the eye was concerned, were produced by architects; but, at the present day, usefulness was so much more prized than ornament, that the architects did not occupy so high an engineering place as formerly. At the same time, he might mention that one of the finest bridges in Dublin was built by an architect, and that under circumstances of no small difficulty. Those who knew the history of Essex bridge would remember that the architect of it introduced the coffer dam for the first time in the United Kingdom, that method having been invented by the celebrated French engineer,

Labcyle. Mr. Vignoles then suggested that the young engineers should take every opportunity of bringing a record of their own works before the institution, and of describing the details of important undertakings with which they might be connected. In doing so they should not indulge in fine writing, but state the facts clearly, concisely, and graphically, leaving them as a text on which useful discussions would arise. Having offered some further advice to the younger members of the profession on this subject, the president referred to the improvements which had taken place in Ireland during the last twenty or thirty years. The Lord-Lieutenant, in the course of a conversation which he had with him recently, stated that he considered it a matter of great importance that people in Ireland should turn their attention to something more than agricultural pursuits, and that he considered engineering in all its branches was one of the best guides to be adopted by those who desired to aid in the improvement of Ireland. The improvement which had already taken place was enormous, and had progressed not merely *pari passu* with that of other countries, but in a much greater degree. He thought he could trace in the whole history of Ireland, during the last fifty years, the influence of engineering in its development and progress. The Under-Secretary, General Larcom, himself a distinguished engineer, confirmed the remark of his Excellency in a conversation which he (Mr. Vignoles) subsequently had with him. In fact, as the Lord-Lieutenant said, engineering and farming must go hand-in-hand. Two centuries ago, in France, the illustrious Richelieu considered it necessary that a special school for engineering should be established, with a view to the internal improvement of the country, and he accordingly founded a school, from which many learned and distinguished men had proceeded. As a general rule, French engineers were too theoretical, and were deficient in practical knowledge. The engineer of a great work in France scarcely ever went out of his cabinet. He received a report from an engineer next to him; that engineer received a report from another. This system was carried still further down, until the whole of the practical part of it seemed to emanate from the man called the conductor of works,—a person who, in rank, would correspond with a sergeant in the army, or a foreman; but these were, in fact, the most practical men in the country. The same system was pursued in Germany, Austria, Russia, and Spain. He held, that the essence of the business of a chief engineer was, that he should not only be able to design a work, but to judge of the construction in every detail. He hoped the engineers of this country would never abandon their own system for the Continental one, and that all his hearers would ever bear in mind that engineering, as applied practically, must be learned on the ground and in the workshop. Mr. Vignoles then referred to the progress of engineering in Ireland. From the peculiar circumstances of the country forty years ago, the Board of Works had necessarily to take a great lead and to make a great number of appointments. This was distasteful to the public, and it was probably in a great measure owing to that feeling that the lines of railway laid out by Government had not been those followed by private individuals. In France a different system prevailed, the lines being not only constructed on the plans laid down by Government, but mainly by their assistance. On the whole, however, the French lines, though they were more equally distributed through the country, did not, taking account of the Government contributions, pay as well as the English railways, which were constructed solely by private enterprise. He particularly wished to impress upon all young engineers, the axiom that, in Great Britain, the success of an engineer was merely dependant on the success of his work as a commercial speculation. It was in vain for a man to say that he had constructed a great work, like a tunnel, a viaduct, or a great ship surpassing anything seen before. He might gain fame, but if his works did not pay, he would not advance in the way in which engineers expected to advance in this country. The progress of engineering in Ireland had been greater than in any country he knew of, in proportion to its extent and capital. Every time he came back to Ireland, at distant intervals, he was astonished at the improvements which he saw in every part of the country, and all of which he could trace to some part of engineering. The president then referred to the great improvements in lighthouses which had been suggested and carried out by Mr. Stoney and Mr. Cotton; to the admirable keel-buoys invented by Mr. Stoney, which had excited so much interest in London; and to the successful manner in which that gentleman had constructed concrete walls, by using a cement capable of resisting sea-water. He referred to Mr. Brett's successful contest at Arklow with the sands that threatened to close up the harbour, contrasting it with the failure of similar operations at Bayonne; and having paid a graceful tribute to the abilities and character of the late Mr. Barry Gibbons, he spoke in terms of admiration of the process by which Mr. Hudson had succeeded in consolidating and compressing peat for fuel. The drain on our coal-fields was now so great that he thought not more than a generation would pass before coal would be sold at the pit's mouth many shillings per ton dearer than at present; and if Mr. Hudson could now sell compressed peat at 8s. 6d. per ton, and make a handsome profit, what might not be realized from that source when coal became scarcer and dearer? We had in Ireland two million acres and a half of bog, covering one-fourth of the area of Ireland, available for fuel. Mr. Vignoles again eulogized the engineering school of Trinity College, and stated that he had twenty Irish engineers working as his assistants in Spain, many of whom had been educated in that college, and all of whom acquitted themselves satisfactorily. In Russia, Austria, Canada, and South America, he had heard most gratifying accounts of rising young engineers who had taken out their diplomas in that engineering school. He might mention, as successful Irish engineers, Mr. Hamilton Kenealy, who was largely employed by Government in the construction of public works in Canada; and a relative of his own, Mr. Sheilds, who is one of the best authorities on ironwork in London, and is constantly consulted on that subject. All the details of the iron framework for the great monument which is to be erected from the designs of Mr. G. G. Scott to the memory of the late Prince Consort, have been calculated and arranged by Mr. Sheilds.

ROMAN REMAINS IN CHESTER.

ON Thursday evening, the 14th, at the Society of Antiquaries, a paper on the above subject, by Mr. Tite, M.P., was read by the secretary. It appeared that in the autumn of last year, Mr. Tite was passing through Chester, when his attention was attracted to a photograph in a shop window of some apparent Roman remains, which led him to make further inquiries, when he found they were discovered in digging the foundations for rebuilding the old inn in Bridge-street, Chester, called the Feathers—a building supposed to be as old as the time of Edward III. On further examining these excavations, Mr. Tite found the distinct remains of a small temple or shrine. This temple originally consisted of twenty-four Corinthian columns, four at each end, and eight on each side. Of these ten remained in their places—that is, there were ten bases and considerable portions of the shafts. The account of the discovery appears to be the following:—In the month of June last, in digging the foundations, the workmen came upon two distinct portions of ancient buildings. On the eastern side was a space of about 23 feet square, which was supposed to be the hypocaust of a bath, from the presence of between sixty and seventy stone pillars, 32 inches high, with capitals 12 inches in size, somewhat similar to those discovered in the buried city of Wroxeter. The absence, however, of any flue tiles, led Mr. Tite to infer that these pillars were merely intended to protect from damp the superincumbent tesselated pavements. About a fortnight after the discovery of this so-called hypocaust, there was found to the north of it the base of a Roman column, 27½ inches in diameter across the top, and 4 feet 8 inches high, resting on a square block of red sandstone, standing on the maiden rock. At the distance of 11 feet 9 inches the base of a second column of similar mouldings and proportions was met with, and subsequently a third and a fourth, between the last of which are the remains of a Roman wall, 14 feet deep, cut in the solid rock. In the front of these bases, and at a distance of 39¼ feet, have been discovered the bases of six columns, forming part of the other side of the temple. This was the state of things when these remains were fortunately seen by Mr. Tite. He perceived that the ruins were of the same date and character as those discovered at Bath in 1780, and which are extremely well exhibited in the works of Lysons and Carter, and also preserved with great care in the Museum of that city. Mr. Tite caused a careful plan to be taken of all the remains, in which he was much assisted by Mr. Hodgkinson. In the paper read, he stated that though in Britain, Roman walls, pavements, arches, &c., were constantly found, yet he had never before seen the remains of any columnar architecture. Even London had never produced any traces of such decorations. A restoration of the whole building, with its baths, palæstra, gardens, &c., a restoration of the temple or shrine, which must have been 110 feet long by 39 feet 6 inches in width, and a comparison of the Corinthian order at Chester and its ornaments as compared with those found at Bath, were exhibited.

INDUSTRIAL ART IN FRANCE AND ENGLAND.

A TRANSLATION of some portions of an article in the *Revue des Deux Mondes*, by M. A. de Beaumont, is given in the *Journal of the Society of Arts*. We take a paragraph or two:—"Some years ago the superiority of France in industrial art was scarcely a subject of doubt. In this domain, where clever workmanship can only exist corrected and disciplined by a taste for the beautiful, we did not know of any rivals. Even at the Exhibition of 1855 we retained the preference for ingenious inventions and productions of an elegant kind. And yet, in 1862, a remarkable event took place, French industrial art found at the Universal Exhibition of London a rival, an unexpected competitor, nearly a conqueror, in British industrial art.

How explain this sudden triumph of our neighbours? By what secret had they in five years acquired those rare qualities of which we were so justly proud? Such is the question which those who take an interest in a closer alliance between art and industry in France did not venture to put to themselves a year ago without reasonable anxiety. At the present time this question is renewed, and it would seem that at the Exhibition which has been some time opened at the Champs Elysées, French industrial art itself wished, in presence of its new rival, to examine itself as to its real strength, submit to the judgment of the public its newest productions, ascertain what progress had been made in the last few years, and ask itself what remains to be accomplished. This attention to progress in the several branches of art in which we have hitherto been considered superior, is certainly not to be denied. It testifies to a real feeling of the requirements of our period. We live in an age where positions are easily changed, and where it is necessary (and it is the same with mankind as it is with individuals) in order to secure the position already required, to increase our efforts to keep ourselves always in the right direction. Is it sufficient to know our position, to number with pride the riches we possess, to acknowledge with regret the riches we have lost? Certainly not, and France, one must own, deceives herself rather too much about exhibitions. Exhibitions repeated at short intervals cannot have any very sensible influence on art. Our neighbours proceed with less show but more logic, and here we are recalled to the question which evoked the Exhibition of 1862. That exhibition at least taught us one important fact, which is, that in barely ten years England had nearly surpassed us in applications of art to industry; but the explanation of this great advantage for England is in the part she has taken, not at the exhibitions, but in the study of art itself. These years have not been passed in admiring her own productions,—they have been passed in instructing, in strengthening herself by the study of good examples; in a word, by her developing at home instruction in industrial art in the most liberal manner.

After the great international gathering inaugurated by the Exhibition of 1851, England felt her inferiority in that sphere of industry which specially applies to art. A noble spirit, whose memory is justly revered, Prince Albert, pointed out the causes of that inferiority, and took the initiative of those improvements which in ten years have nearly changed the aspect of affairs. England possesses at the present moment 800 or 900 societies, whose mission it is to propagate a feeling for art and taste. These societies number 200,000 members, which in their turn encourage 100 schools of art, and nearly 300 private industrial schools. Museums of all kinds have been created for each industry, with public instruction and special lectures for the different

kinds of manufacture. To this development has been added the purchase of books, drawings, and engravings, which may serve as models and examples. This vast system carries with it a considerable amount of funds, and a body of intelligent men devoted to art and attached firmly to these institutions by a proper remuneration. We saw in 1862, in London, several specimens of the works of these new industrial schools of art, and we must acknowledge that if the students are not so clever as those of our schools, they arrive, thanks to the happy choice of models, at an incontestable superiority. Regarding the excellent movement of Schools of Industrial Art which England presents to us, where is France at the present time? The Exhibition of 1862 showed this to us, for there was the happy idea, which deserves to be encouraged, of bringing the schools of the whole country into that industrial competition. It is, therefore, necessary that France should know how to recognise that which England acknowledged to herself ten years ago, that her instruction in industrial art requires a complete reformation. The study of nature and the old masters, the only fruitful study which manifests itself in England in such important results, is scarcely found, except very feebly, in the drawings exhibited by the students in the Champs Elysées. The greater part of the drawings exhibited betray a bad method applied to the education of our young industrial artists, who are generally kept in a closed room facing a cast without interest, or before those tortured lithographs the laborious execution of which a child is kept for months studiously endeavouring to imitate. How much time is lost in producing these symmetrical hatchings, which make the pupil forget the object of the design, and even the subject which is being copied. If the students were only surrounded by the elegant and precious objects which ornament the palaces, perhaps their imaginations, awakened by the comparison of the beautiful, would not depart from the laws of taste; but this cold atmosphere of the school or class-room is not calculated to give to youth that pure and elevated taste which the grandeur of divine works of art alone can inspire."

NOTTINGHAM ARCHITECTURAL ASSOCIATION.

A CONVERSAZIONE was held at the residence of the president, Mr. T. C. Hine, on the evening of Wednesday, the 6th inst., and was attended by the mayor and ex-mayor of Nottingham, and other gentlemen interested in science and art, the special objects of the meeting being to hear a short paper from the president upon the architecture of Italy, which had been prepared by him from notes made during a recent tour. In order to illustrate the subject and bring it more distinctly before the mind of the hearers, a number of large photographs were hung about the room, together with sketches. The lecturer described in graphic language his own and fellow traveller's feelings as they passed that dreary "Campagna," with hillocks of mouldering earth heaving around them, as if the dead beneath were struggling in their sleep, which form the long and dreary dead sea of land around the "Eternal City." By-and-by a dull purple haze stretches level along the desert, veiling its spectral wreck of massy ruins, in whose rents the red light rests like dying fire on defiled altars; and as unutterable feelings came bubbling up at this first glimpse of the glories of bygone majesty, the travellers wondered that their charioteer showed not one spark of enthusiasm, but drove on his jaded cattle with his "whirr and whoop," as if no greatness had ever been, or no grandeur slept around; and what appeared still more shocking, upon entering the city they found long lines of streets, with gas burning in lamps, supported by lamp-posts, just such as they had left in Nottingham, and with shops, where hats, coats, shoes, and all other English wants could be supplied in English language; and at their hotel they found beefsteaks, coffee, tea, with Burton ale, and London and Dublin stout, served by waiters in slightly broken English words. This, however, was modern Rome shown by gas-light; but when the great light dispelled the mist of the coming morn from the top of the Apennine hills, then the "Eternal City" blazed forth in its awful majesty, and broken column and triumphal arch told them they were now in the city of the giants of the past. A photograph, some 6 feet long by 2 feet wide, of the forum between the Palatine and Capitoline hills, and lying in the small space called the Campo Vaccino, with the Forum of Trajan, the palace of the Cæsars, the temple of Esculapius, mixed up with convents and churches, enabled the hearers to follow the reader closely, as he led them amidst the greatness of the past to some of the present wonders. The Vatican, 1,151 feet long and 767 feet wide, with its eight grand staircases, 200 smaller staircases, 20 courts, and 4,422 apartments, and filled with the choicest antiquities, and the priceless works of ancient and modern times; and the basilica of St. Peter, 607 feet long in its central body, and 445 feet wide in the transepts, and 458 feet high, from the pavement to the cross surmounting the dome.

ARCHITECTURAL INSTITUTE OF SCOTLAND.

THE report read at the annual general meeting of the Institute, and since printed, gives the following abstract of the treasurer's accounts with the Architectural Institute of Scotland, for the year ending 31st of October, 1863:—

Charge.

Balance in treasurer's hands at close of last account		£1 12	4
Balance in account with British Linen Company's Bank at ditto		111 13	4
Arrears at 31st October, 1862		30 9	0
Annual subscriptions for 1863—63		126 0	0
Interest on account with British Linen Company to 15th April last		2 19	9
Special fund for endowing a chair of architecture, consigned in British Linen Company's Bank on deposit receipt, dated 31st October, 1863	£19 6 5		
Interest thereon for year	0 8 3		
		19 14	8
Balance due to Treasurer on 31st October, 1863		17 1	1
		£309 10	2

Discharge.

Rent, taxes, &c., paid for rooms		£17 12	0
Accounts paid for printing		23 18	6
Expenses of lithographs, medals, and drawings purchased:—			
Lithographs	£43 8 0		
Medals	6 0 0		
Drawings purchased	7 10 0		
		56 18	0
Miscellaneous general expenses:—			
Expenses connected with meetings, fitting up rooms, &c.	£18 3 4		
Treasurer for collectors and outlays	11 0 6		
Secretary's outlays for postages, &c.	3 17 6		
		33 1	4
Arrears outstanding at 31st October, 1863		48 6	0
Amount in deposit receipt of British Linen Company, on account of fund for endowing a chair of architecture		19 14	8
Balance in British Linen Company's Bank at 31st October, 1863		109 19	8
		£309 10	2

NORTHERN ARCHITECTURAL ASSOCIATION.

LAST week the annual meeting of this association was held in Newcastle, Mr. Pritchett, V.P., in the chair. Mr. Austin read a report from the committee, from which we learn that two members and two associates have been added to the association during the past year, and two members and associates have sent in their resignations, owing to their leaving the district. The treasurer's report shows a balance in hand of 5*l*. 9s. 1d., which would have been 12*l*. 15s. but for the amount of subscriptions in arrear.

The Chairman then read an address touching on various current topics. He congratulated the association on having brought together with good feelings all the architects of the district. In the course of his observations the reader said:—

"The embankment of the Thames, though not strictly an architectural work, will have really a greater influence on architecture in the metropolis than any event likely to happen in the present century. Land is acquiring such a fabulous value in the metropolis that Government may well pause before they open any new great streets to relieve the stupendous traffic from east to west. But here we have a scheme by which a most magnificent thoroughfare is gained from a useless, unsightly foreshore: and, when both sides of the river are completed, the sail from London Bridge to Westminster Bridge will be one of the finest architectural spectacles in existence. Another project, in fair prospect of accomplishment, is a viaduct across the valley of the Fleet at Holborn-hill. This is capable of great architectural display, and, if well managed, will form a striking object. I now come to a class of structures that are rapidly rising in the metropolis, and threaten even some of our northern towns, which are equally a disgrace to those who perpetrate and those who quietly permit them—I mean the railway-bridges crossing the principal streets at low levels. Of these, the most disgraceful is the one sanctioned across Ludgate-hill, spoiling what is now the best view of the finest work of the cleverest architect of modern times. Well may we ask, what was Parliament about to allow such a scheme to be smuggled through, so that no one knew what they were about till it was too late? In vain may they make it 'an ornamental bridge:' no beauty in the obstructive can compensate for the beauty obstructed: and one of the finest views in London, the drive up Ludgate-hill, is ruined for ever, and that for a mere money-making scheme. Not so important in their results, but far more hideous in themselves, are the enormous pontoons that are being hoisted across some important streets for similar purposes. Very thankful am I to see that the Institute have taken the question up, and are going to memorialize Government to appoint a commission to lay down a comprehensive scheme for metropolitan intercommunication. It is a question we are all interested in, as we all go more or less up to town. So as soon as presented, I shall, as secretary of the Alliance, endeavour to get all the allied societies to support the memorial; believing that if the same plan had been adopted thirty years ago for the country at large, our railway system would have been far more perfect and enormously more economical than it is."

THE WORCESTER SCHOOL OF ART.

THE general meeting of the friends and supporters of this school has been held in the Guildhall, Worcester, the Earl of Dudley, in the chair. One of the honorary secretaries read the report, which stated that the progress during the past year had been satisfactory. The Government inspector, Mr. Wylde, had awarded 22 bronze medals several of them being for works in the highest class of study. At the personal examination in the second grade he passed 29 papers, and awarded 8 second-grade prizes, 20 first-grade prizes, and certificates, and his report was very favourable. At the national competition one Department prize of 10*l*. and one medallion were received by the school. The drawing classes, attended by the masters of the School of Art, at national and other schools in Worcester, had continued in satisfactory operation.

The statistics of the Worcester school and its branches, exclusive of Bromsgrove, for the year 1863, might be summed up as follows:—Total number of persons taught, either in the school or by its agency, 1,142, being an increase of five over the previous year, which included Bromsgrove; but without Bromsgrove the increase would be 223. The state of the finances was more prosperous than heretofore, there being a balance of 36*l*. 5s. 10d. in favour of the school.

The Mayor, in moving the adoption of the report, observed that it was the first time for many years that the financial balance had been on the right side.

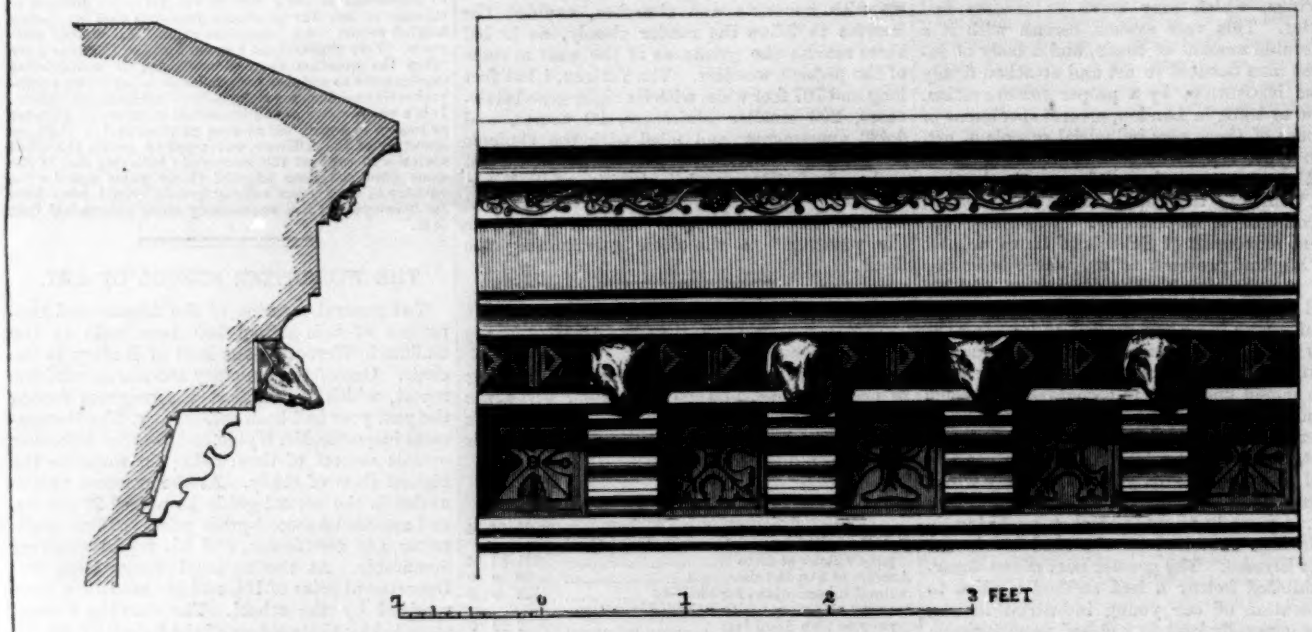
RAILWAY MATTERS.

THE traffic receipts of the railways in the United Kingdom for the week ending January 16th, 1864, upon a mileage of 10,882, amounted to 515,503*l*., being equal to 47*l*. 7s. 6d. per mile. For the corresponding week of last year the receipts were 474,777*l*.; the number of miles open, 10,494, or 45*l*. 5s. per mile. A comparison of the two weeks shows an increase in the aggregate receipts of 94,726*l*., and of miles open, 388, at the rate of 105*l*. per mile. On the lines having termini in the metropolis the increase has been: On the Great Eastern, 496*l*.; Great Northern, 4,049*l*.; Great Western, 3,626*l*.; London, Chatham, and Dover, 1,242*l*.; London and North-Western, 7,180*l*.; London and South-Western, 991*l*.; Midland, 2,296*l*.; North London, 223*l*. There is a decrease upon Blackwall of 29*l*., and on Brighton of 873*l*. In the principal lines in England and Wales there has been an increase on the Lancashire and Yorkshire of 4,043*l*.; Manchester, Sheffield, and Lincolnshire, 886*l*.; North-Eastern, 3,457*l*. A decrease on North Stafford of 1,104*l*. In the Scotch lines, the Caledonian shows an increase of 2,045*l*.; the North British, 848*l*.; the Scottish North-Eastern, 286*l*. And in Ireland, the principal increase has been upon Dublin, Wicklow, and Wexford, 670*l*.

On comparing the traffic receipts of railways in the United Kingdom, published weekly for the year 1863, amounting to 29,953,960*l*., with those for the year 1857, amounting to 23,729,665*l*., an increase is shown of 6,224,295*l*., being at the average rate of 1,037,738*l*. per annum, but the increase in each year differed greatly from the average.

A public meeting of the owners and occupiers of property in the ward of Billingsgate has been held in Botolph-lane, to consider the several metropolitan railway schemes to be submitted to Parliament next session. Mr. Alderman Sidney, M.P., occupied the chair. It was determined that a petition to the House of Commons should be drawn up to restrict the sweeping away of property and trade in the City by new lines of railways, and a hope was expressed that a similar opposition would be shown in other quarters of the metropolis.

It has been proposed, says a *Wexford* paper, to present a Bill to Parliament next year for the



NEW BUILDINGS, EASTCHEAP.—*Cornice in Terra Cotta.*

formation of a railway from Gorey, in Ireland, to Courtown, and of a new pier at Courtown Harbour. The route of the proposed line of railway has been examined and pronounced favourable by Mr. H. P. Ribton, C.E., accompanied by Mr. P. J. Moran, C.E., lately connected with the Dublin, Wicklow, and Wexford line.

NEW BUILDINGS, EASTCHEAP, LONDON.

TERRA COTTA.

THE engraving in our present number exhibits the premises lately erected at the corner of Philpot-lane, occupying the site of Nos. 38 and 39, Eastcheap, for Messrs. Hunt & Crombie. They are six stories in height, including the basement, and will be used by that firm as show-rooms for colonial produce, and as offices on the ground and first stories; the remainder being devoted entirely to warehouse purposes.

The façade on the two lower stories is executed in Box ground stone; the upper stories are built of white bricks, relieved with bands of red and black brickwork, with stringcourses of stone. The fronts are divided into double and triple windows above the ground story; the openings are semi-circular, with gauged arches of red, yellow, and black bricks, with keys and voussoirs of white bricks, and stone label mouldings banding the arches. Each window is divided with detached columns of terra-cotta, having enriched capitals and bases, graceful in design and with a diversity of colour. The building is canted at the corner, and a single window with columns is there introduced on each story.

The large cornice at the top of the building is composed entirely of terra-cotta, and is nearly 4 feet in depth, having corbels, enriched paterae, and animal heads introduced. This we illustrate more at large. The medallions in the spandrels on the several stories are also of the same material, effectively produced. Those at the corner represent the crests of the architects, and of the chairman of the trustees of the Whitechapel Charity Estates, to whom the freehold belongs. The stone capitals on the ground story, and the entrance-door and spandrels, are enriched with carving and emblematical foliage, and additional richness has been imparted to the central entrance by the introduction of the monograms of the firm, with crested shields.

Internally the construction and arrangement appear to be satisfactory. The staircases, which are of pitch-pine, present several novel features, having enclosures in lieu of balusters, perforated and cut in circles and patterns, with chamfered newels, moulded balls and pendants. The floors are carried on cast-iron girders and columns, and the sashes and doors of the ground-story are of polished wainscot, the former being filled in with circular moulded tracery springing from columns and enriched capitals. Lavatories and water-closets are provided, fitted up with Jennings's patent fittings. The roof is covered with a flat of Vieille Montagne zinc, and is approached by a staircase. The ceiling of the ground story is divided into compartments, by moulded ribs of pine, filled in with plastering.

The design may be considered as an advance in London street architecture for commercial purposes. The architects are Messrs. John Young & Son, of King-street, Cheapside; the builders are Messrs. Piper & Wheeler.

The terra-cotta work has been successfully executed by Mr. Blanchard, of Blackfriars-road; and Messrs. Nettle & Sansom, of Westminster-road, were the architectural sculptors. The total cost will be above 3,500*l*.

ACCIDENT ON THE MIDLAND RAILWAY WORKS.

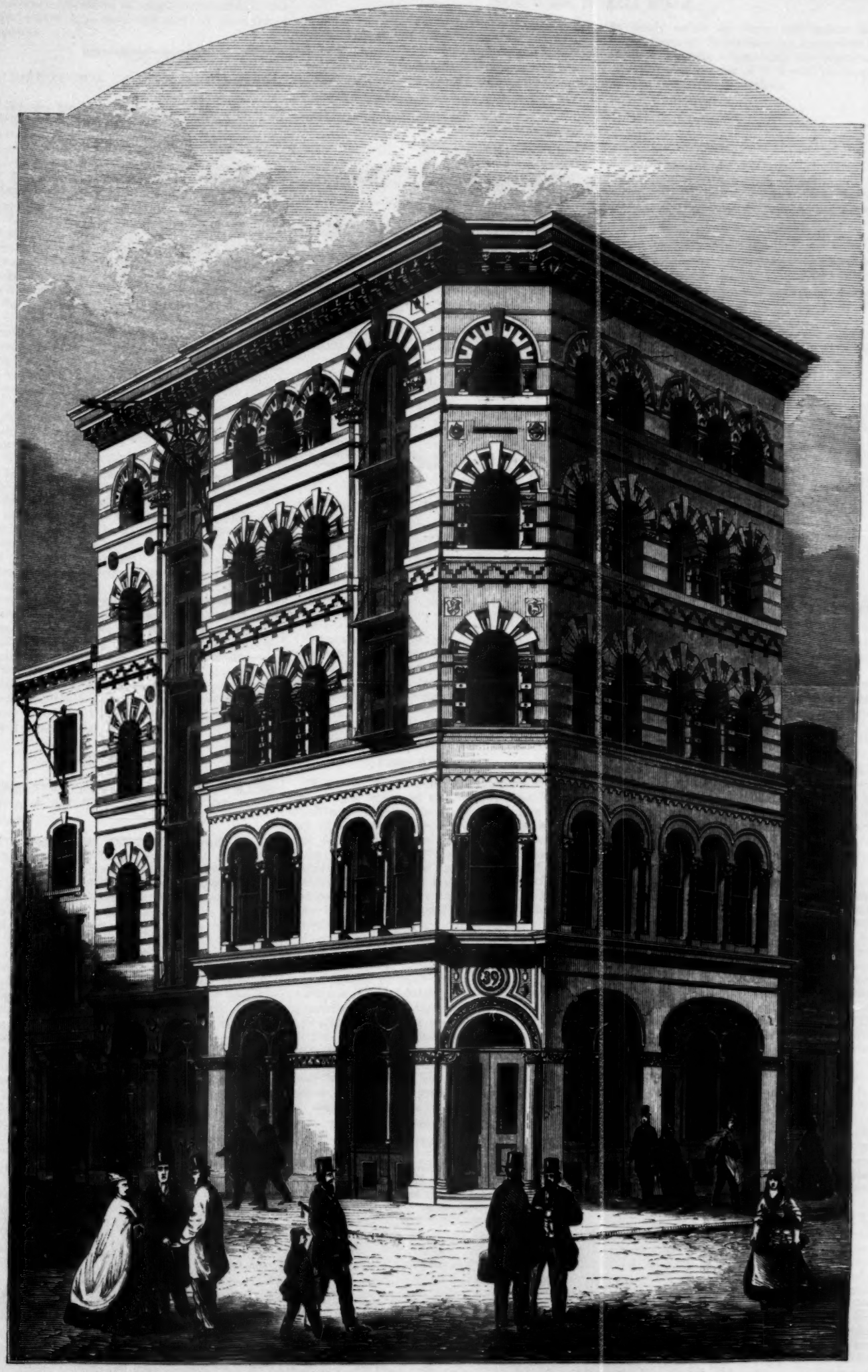
FOUR arches fell, at Agar Town, on Wednesday morning last, and killed several horses. That portion of the works where this catastrophe took place is abutting on the excavations which are being made for a coffer dam and docks, to be constructed under stores which are to be erected for Messrs. Allsopp & Co. and Messrs. Bass & Co. This excavation is situate between the western side of the Regent's Canal and the King's-road, Camden Town. On the south-western side of the excavation there was, up to yesterday morning, existing a series of exceedingly large arches, forming the viaduct by which means the old road from the King's-road to the upper part of Agar Town was carried up to the level of the iron bridge over the canal, constructed some ten or twelve years since by the Ecclesiastical Commissioners on coming into possession of that portion of the Agar estate. The building contractors were Messrs. Smith & Co., of Leicester, who had sub-let their contract for pulling down these arches to Mr. Lawrence, a builder, of Hackney. Cracks have been observed in the arches for some time, but it is stated not to such an extent as to cause danger to be apprehended.

THE WATT AND WEDGWOOD PHOTOGRAPHS.

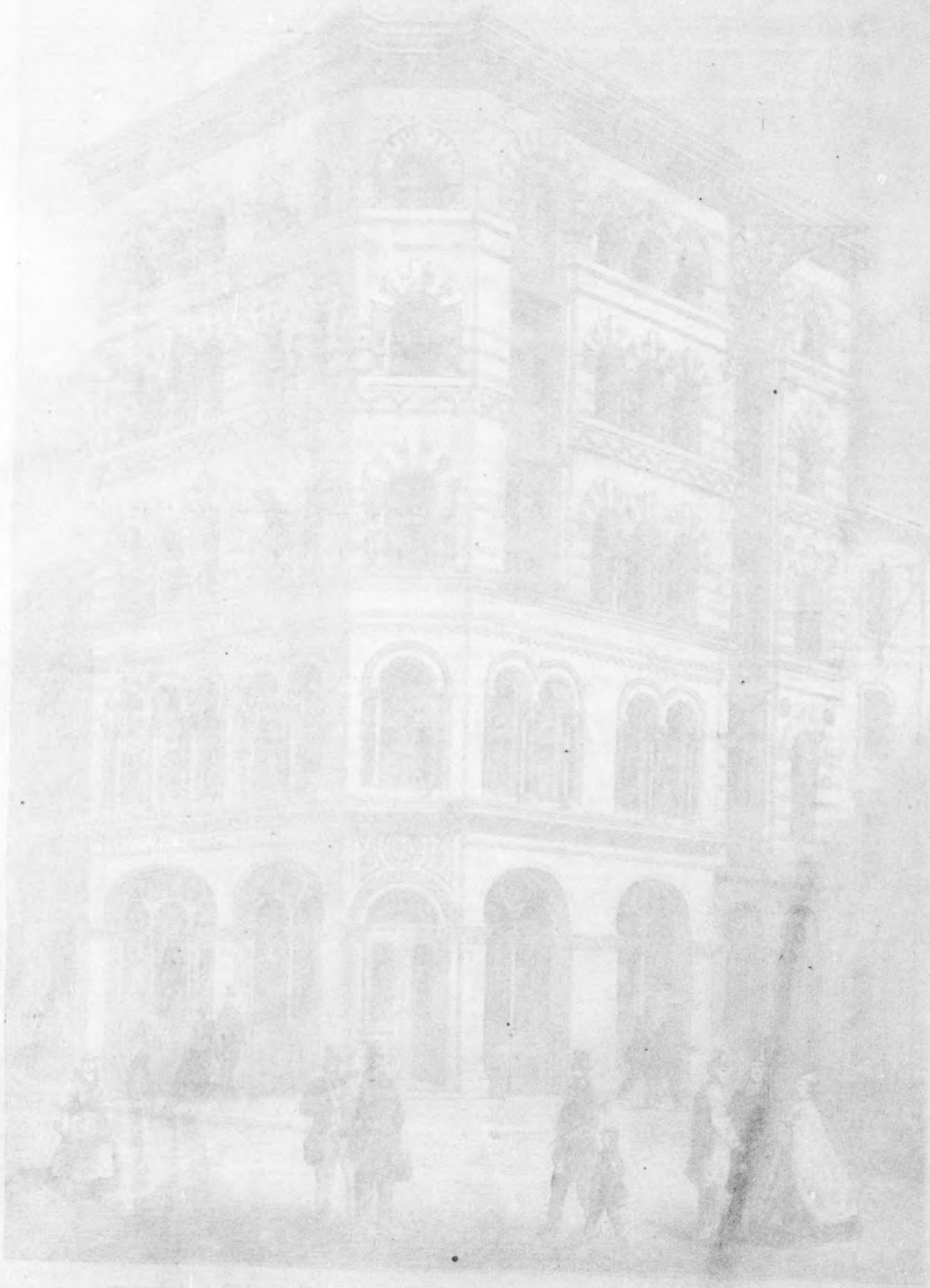
THIS interesting subject has been discussed by the Photographic Society of London, but not very favourably to the idea of either Watt or Wedgwood having been a photographer. The photograph found by Miss Meteyard amongst Josiah Wedgwood's papers has, strangely enough, been confronted with one "from the same negative" which was exhibited by Mr. Malone as having been "taken by Mr. Fox Talbot about the year 1843;" and it could not have been among the earliest of Mr. Fox Talbot's photographs, for he himself showed the writer of this one at Glasgow at an earlier date than 1843. How the photograph in question came to be amongst the Wedgwood papers has not yet been ascertained; but it seems that these papers have *not* been locked up for fifty years: so Mr. Boulton says. As to the large "photographs," though peculiar, they are regarded as specimens of printing in colours. One of the silvered copper-plates has been pronounced by Messrs. Hughes & Kimber, the copper-plate manufacturers, to be only about twenty-four years old. It is a curious fact, however, that it has been ascertained that a person named Daguerre was Wedgwood's agent for the sale of his pottery in Paris. It seems to be believed that the Lunar Society, of which Watt was a member, were engaged in photographic experiments, so that there is still some mystery in the whole affair.

THE STEPHENSON STATUE AT EUSTON SQUARE.

A VAST sum has been expended on the railway station at Euston-square. The interior, however, is not very satisfactory. This was the first London railway terminus, and a fitting style of architecture for this especial purpose had not been established. The waiting-hall is of fine proportions, and in parts excessively decorated; but this decoration is not over well applied; for, while the roof and cornices are lavishly ornamented, below, huge bare spaces are left, lacking harmony with the other. Any objects, such as pictures of those connected with the progress of road-making, canals, and railways, would tell well on this space; or perhaps, it would be better to place here a glazed copy of the large ordnance survey, which would be both useful and instructive to the large number of persons who often are obliged to wait here. Our chief object, however, in noticing this station at present is to direct attention to the neglected condition of the statue of George Stephenson, which looks, particularly as regards the countenance, as grim as when in early days he was engaged about the pits. This statue is not, upon the whole, a good one. The dress-coat is of such an indifferent fit, that it raises the idea that he could have made a better one himself: no one ever saw him wearing dress pumps, which he would kick off with the utmost contempt were he alive. The pedestal of this statue is a miserable affair, and should be replaced by a better one, which should not be so high, but broader. The name should be cut upon it too, for few know whom the statue is intended to represent. We lately overheard a gentleman of intelligent appearance telling his son that it represented Mr. Huskisson, who was killed at the opening of



NEW BUILDINGS, EASTCHEAP, LONDON.—MESSRS. JOHN YOUNG & SON, ARCHITECTS.



the first railway. Whether this be done or not, however, the statue should be relieved from the dirt which has been allowed to accumulate upon it.

INSTITUTION OF CIVIL ENGINEERS.

AT the meeting on the 12th inst., Mr. J. R. McClean, the president, delivered an address, on taking the chair for the first time since his election. It was resolved that this address should be printed and circulated with the Minutes of Proceedings. The paper read was "On the Closing of Reclamation Banks," by Mr. J. M. Heppel.

The chief objects of the paper were to bring clearly into view the circumstances which determine the velocities of influx and efflux, and consequent scour, attendant on the closing of embankments for reclaiming land from the sea, or a tideway, and constituting the chief difficulty to be overcome in executing such works.

It was shown how, by an easy geometrical process, curves might be constructed which would indicate correctly the difference of the levels of the exterior and interior water surfaces, at any given interval of time from low water; the data for their construction being the rise of the external tide water, the areas of the interior surface at the several successive levels, and the width of opening through which the flux and reflux took place.

It was contended that, in most cases, it would be better, and a safer practice, to determine in the first instance, by such means, the requisite width for the final closing place, and to construct it in such a way as to ensure its capability of resisting the scour to which it would become exposed, than to leave the closing arrangements till the banks had already advanced so far as to have given rise to considerable outward and inward current; as it was argued that, if this were done, the carrying up of the banks to each side of such final closing place would be effected with ease and certainty; and the preparations for final closing, having been made from the commencement, could also occasion no unforeseen difficulty; and that thus the whole operation would be brought more within the province of precise calculation, and adaptation of means to the required end, than according to present practice it usually was.

PRESERVATION OF BUILDING MATERIALS BY THE RESIDUUM OF COAL TAR.

IN France the residuum obtained by the distillation of tar, for the purpose of extracting the oils and hydrocarbons is called *brai* (coal-tar pitch in English). Upon immersing bricks in this resin, melted at 200 degrees, they become fit to use with success in the construction of chlorine chambers, also for condensers for chlorhydric acid. Plaster acquires a strong consistency, and does not crack as it does after being dipped in silicate of potash or soluble glass: by virtue of its porosity, it is thoroughly penetrated by the resin, and becomes permeable to all other substances; while objects moulded in plaster retain their form without the least alteration. This is so true that crystals of gypsum (natural hydrated sulphate of lime) become, in the resin, of a shining black colour, the crystalline form not being changed, but the water of hydration, being replaced by the resin: it is a pseudomorph. Alabaster acts in the same way.

Stones covered with coal tar, or even with greasy or resinous coating, resist the action of wind bringing salt-spray from the sea better than do bare stones. Mr. Kuhlman, according to *Silliman's Journal*, has discovered that resins, greasy matter, and various other substances act in the same way, and that it is also the case with all liquids and bodies in fusion, when they *wet* the body which is to be penetrated. In the case of plaster it is not a simple effect of permeability, but rather of displacement of the water; the plaster becoming anhydrous, is thoroughly penetrated by the tarry matter, and its consistence increases, but the form of the object moulded is preserved unaltered, even when the bath of resin is raised to the temperature of 400 degrees C. At from 150 degrees to 200 degrees C., stearic acid acts like resin; the plaster becomes impregnated with it, and at the same time loses its water of hydration.

WOODWORK IN ASIA MINOR.

BELOW is appended a list of the most common scantlings, plankings, and boardings in use in that portion of Asia Minor which lies between Abydos and Adrymittium. I compiled it when in that country, and it may be depended upon. The reason why I send it to you is because I was lately asked for some information as to *building materials* in Dardanelles, &c.; and as that portion of Anatolia is fast rising into importance, I thought that a copy of it would, perhaps, be useful to some of your readers.

Name (pronounced as written).	Average Length.	Average Width.	Average Thickness.	Why so called.	Remarks.
NATIVE TIMBERS, CHIEFLY LARCH, &c. English Measure.					
	Ft. In.	In.	In.		
Toprak Bitsmessie	13 0	3½	3½	From the word "*joist*."	Shows but little bark.
Araba Bitsmessie	8 0	2½	2½	From being easily packed and carted in "*arabas*."	Usually sawn with the bark left on.
Messera Bitsmessie	9 0	2½	1½	From a town of that name.	Very wancy and unbarked, and sold in two pieces joined at bottom.
Harbare Bitsmessie	6 6	1½	1½	Do. do.	Sold in three pieces, not quite sawn through like the Messera Bitsmessie.
Serai Derek	8 6	4	4	From the word "*palace*."	Picked timber for posts.
Osses	10 6	6	6	From a tree of that name.	Barked only: sold unsawn for conversion into scantlings.
PLANKS AND BOARDS.					
Tavania	7 0	8	¾	From the word "*roof*."	Used for roof covering.
Salichleria	6 0	5	¾	From a town in Anadol.	Used for covering gables.
Ikileekia	6 6	6	¾	From being once worth *two piastres*.	Used for boarding partitions.
Exendaria	7 6	7	¾	From being once worth *sixty paras*.	Used for exterior side walls.
Soubiskiesee	14 0	9	1	From a river of that name.	Used for flooring.
Souveleekia	6 0	5½	1½	From the word "*window*."	Used for window jambs.
Maderea	10 0	8	2	From a place of that name.	Used for tiebeams.
Yermah	5 0	13	$\frac{1}{12}$	From *yermak*, Turkish for 20, the piece being generally split into 20 laths.	This is always split when nailed on the wall.
IMPORTED BOARDINGS, RED, &c.	About				
Venerdika, No. 5	15	16½	¾ to 1½	From 5 stamps upon it.	The highest quality; no knots.
" No. 4	...	14	...	" 4 "	The next best, do.
" No. 3	...	13	...	" 3 "	Medium quality.
" No. 2	...	11½	...	" 2 "	Worst quality but one.
" No. 1	...	9½	...	" 1 "	Lowest quality, knotty, &c.

N.B. These Venerdika boards have always rounded ends, and holes in them, where the bolts passed through, which joined them together when being prepared for rafting down the rivers.

These native timbers are felled in the interior by the male *Turkomans*, and sawn up by the females of the encampment. They cut down part of a forest, and generally let it lie for three years before they convert it; by this means seasoning it a little, besides rendering it easier to saw. Despite the poverty of their tool-chests, the carpenters there are very clever, and a masterpiece of their work may be seen at Chigri, at a *Valonea* warehouse, owned by the *Tchelibi* Mekriditch, which is about 180 feet long, 60 feet wide, and very high. W. EASSIE.

COMPETITIONS.

Chester Townhall.—The town council of Chester, on the report of the townhall committee, which recommended the erection of a new townhall, at a cost not exceeding 16,000*l.*, to replace that destroyed by fire about twelve months since, have resolved "that the committee be authorized to advertise for designs for the new townhall, and to offer a premium of 100*l.* for the best design, and 50*l.* for the second best design, upon the terms and conditions laid before the council."

Peterborough.—The designs sent in for a new church at Peterborough, a few days ago, numbered twelve; and those by Mr. Robert Hutchinson, architect of that town, were selected in preference to the others, and he has received instructions to superintend the work.

Wigan.—The town council of Wigan have purchased land in Rodney-street, on which they purpose to erect a new gaol and corporate offices. Architects are invited to send in designs for a building, the cost of which is not to exceed 12,000*l.*; and premiums of 80*l.*, 40*l.*, and 20*l.* are offered for the best designs.

CHURCH-BUILDING NEWS.

Kensington.—St. Philip's Church, Kensington, which was built about four years ago, has now been enlarged, to meet the wants of the growing neighbourhood. The south aisle has been considerably widened, and a transept added, giving additional accommodation to an extent of between 300 and 400 sittings. At the same time, a stone and marble reredos and sedilia have been added, and some additional decorations carried out to the pulpit, the east window, &c. The organ also (by Walker) has been completed. The whole has been designed and superintended by Mr. Thos. Johnson, the architect of the church. The reredos and sedilia were executed by Mr. Farmer, and the decorations by Mr. Castell; whilst the works in the body of the church were carried out by Messrs. Holland, of Kensington, at a cost of about 1,350*l.*

Tackley (Oxfordshire).—The parish church of St. Nicholas, Tackley, which for the last eleven months has been undergoing renovation, has been re-opened. Some time ago damage was done to the church by lightning; the exterior walls having been grazed in several places, while portions of the tracery in the windows had been dislodged. The rector took the opportunity of impressing on the parishioners the necessity of a restoration of the fabric, which had, indeed, long been required. Mr. Street, the diocesan architect, was accordingly consulted, and subscriptions were entered into. The work just completed was carried out from the designs of Mr. Street, by Mr. Franklin, builder, Deddington. Three windows harmonizing with the west window of the nave (fourteenth century) have been inserted in the nave and south aisle, and the whole building has been renovated. The funds not allowing a new roof of higher pitch, principals of a later character have been introduced in the old roof. A reredos and new stone pulpit have been introduced, and low benches have superseded the old pews. The floor has also been laid with encaustic tiles. A memorial window, executed by Messrs. Clayton & Bell, of London, has been inserted by the rector at the east end; and another, of a lighter character, has been provided in the west by contributions from his former pupils. The outlay has been about 2,000*l.*, of which 350*l.* remain to be provided.

Bath.—The new cemetery at Locksbrook, for the parishes of Walcot, Trinity, and St. Saviour, in this city, has been consecrated. The cemetery is situate on a rise of ground. The site enclosed is eleven acres and a half in extent, seven and a half of which are appropriated for the church, and the remaining three and a half acres for the Nonconformists. It has been laid out by Mr. Mitchell, under the direction of Mr. Milner, landscape gardener; and the total cost to the parishes, including the buildings, will be about 10,000*l.* The chapels are in the Early Decorated style: one chapel for the church and another for Dissenters are provided. These chapels are

united by means of an arcade and carriage-way to a central tower, 100 feet high. The arcades are ornamented by columns of Devonshire marble, and relieved by carvings in freestone. A private pew, also carved, is provided in either chapel. The entrance lodge and gate are in the same style as the chapels. The chapels have been erected by Mr. Streeter, from the designs of Messrs. Hickes & Isaac, of Bath; and the carving is by Mr. Porter, also of this city. The grounds are laid out with collections of shrubs. The ancient Roman coffins found in the progress of the works, we regret to say, remarks the local *Chronicle*, are thrown aside as rubbish.

Ipswich.—The Church of St. Mary Tower is being enlarged and restored at the cost of the mayor, Mr. G. C. Bacon. The ground outside has been lowered nearer to the level of the floor inside. The nave has been heightened, the clerestory rebuilt, and a new high-pitched oak roof put on. The north aisle has been entirely rebuilt and enlarged to the width of the old south aisle, or from 13 to 20 feet, by which an additional accommodation for upwards of 100 persons has been obtained. It contains nine windows, one of which, filled with stained glass, was presented by Mr. J. C. Cobbold, in memory of his son Herbert Wilkinson Cobbold. It was put in by Mr. Wailes, of Newcastle. Mr. Day, of Ipswich, will put in a coloured window at the west end of the aisle. It will consist of three figures in floriated canopies, the figures being St. Augustin, St. Alban, and St. Edmund. Both north and south aisles have new oak roofs nearly flat, and covered with lead. The walls will be finished in colours with ornamentation. Various other improvements are to be effected, and it is intended ultimately to take down the tower, which is 70 feet high, and replace it, farther out, with one of 90 feet, after widening the south aisle to the east end. The new tower will be surmounted by a 75-feet stone spire, making the total height 165 feet. Mr. Phipson is the architect employed, and Mr. R. S. Smith the builder.

STAINED GLASS.

Louth Church.—The stained glass west window which, through the liberality of Mr. C. Parker, has just been placed in the parish church, is an illustration of the Te Deum. Messrs. Hardman, Birmingham, were the artists.

Coggeshall Church, Essex.—A stained glass window of four lights, containing four subjects, in large panels, illustrative of the life of King David, has been erected by Mr. Frederick Preedy, of London, at the expense of Mr. Thomas Sadler, of Halsted.

Watford Church.—At the parish church of Watford, the west window, of Early Perpendicular character, has recently been restored and filled with stained glass by voluntary contributions, as a Memorial of the Marriage of the Prince and Princess of Wales. The principal subject is the Marriage Feast of Cana in Galilee, and extends across the centre of the four lights, the upper portions being occupied by foliated canopies. Below are small medallions on light grounds, representing Eve presented to Adam; the meeting of Isaac and Rebekah; the Marriage of Boaz and Ruth; and that of Joseph and the Virgin Mary. The head of the window is filled in with the Royal arms of England, as borne by the Prince of Wales; the arms of Denmark; and those of the Prince and Princess of Wales, empaled; with mongrams, and the date of the marriage in the small openings. The heraldry fills portions of the window frequently treated as of comparatively little importance, and sets forth the occasion of the erection of the window, and tells its "Memorial" story more distinctly than can be done by the inscription at the bottom. The glass was designed and executed by Messrs. Heaton, Butler, & Bayne, and under the superintendence of Mr. John T. Christopher, of Watford, who acted as Honorary Architect.

St. Denis's Church, Stonton-Bickworth, Leicester.—The chancel window of this church has just been filled up by a subject representing the Crucifixion, painted by Mons. T. Dury, of Warwick. The two Marys and St. John are grouped at the feet of our Saviour, and the foliated canopy contains a figure of St. Denis. The window is the gift of Mr. J. Wright, of London.

St. Paul's Church, Warwick.—Another window, the gift of the Rev E. T. Smith, incumbent, has been placed over the font in this church, to the memory of his third daughter. The subject, painted by M. Dury, of Warwick, represents a guardian angel carrying to heaven the infant in his arms.

St. Mary's (R.C.) Cathedral, Newcastle-upon-Tyne.—Another stained glass window has been put up in this cathedral. Its style is Decorated of the fourteenth century. The subject of the design is from a group selected from the life of Saint Elizabeth of Hungary, on foliated backgrounds of a decorated character. The window is in memory of the late Mrs. Eliza Janet Charlton, wife of Dr. Charlton, whose arms and initials are inserted in the tracery. The window was from the stained glass works of Mr. H. M. Barnett, of Newcastle-upon-Tyne.

Fethard Church, Clonmel. — A window of coloured glass, in frame and mullions of Portland stone, has been inserted at the east end of Fethard Church. Mr. William Miller, of London, was the artist. The frame and mullions were wrought in Portland stone by Messrs. H. Poole & Sons, of Westminster. The design of this window is taken from the eastern window of Muckross Abbey. It consists of four compartments, with simple tracery, filled in with toned glass, the pattern being worked out with various tints of deep colouring. Foliage and ornamental scrolls with texts are inserted. A guard of galvanized wire at the back protects the glass. It is wished by some of the committee that two side east windows of coloured glass should be added, out of the surplus fund which remains with them.

STYLE IN ARCHITECTURE.

"Laugh where we must, be candid where we can."—Pope.

DEAR MR. EDITOR,—In my last little essay on "Architecture Prop-er and Shamistic," in your impression of the 2nd instant, when speaking of the influence of stucco or compo upon style, I felt that much could be said about style, but that the subject demanded a separate essay. That essay I now proceed to make.

Style in architecture exercises an enormous and peculiar influence over stylish minds. It has been remarked by a talented author on Architecture, to whom allusion was made in a former essay—Dr. Jobbins—that a building in the "Gothic style" should be "thoroughly consistent with the period of its style." What a building *not* in the Gothic style should be consistent with, he does not inform us. Whether any other style would be altogether inconsistent with everything, or if consistent in any building with anything, we are left to mere conjecture; for the Doctor is so taken up with the "Gothic style," or rather with his own crude notions of the style, that he loses himself—not like Thomson, in "light ineffable," but in *oscuro profundo*.

But then, *style*, and consistency with period—"ay, there's the rub," and also the rubbish. That a building should be thoroughly consistent with the principles of truth, and the object for which it is designed would tend to put that wretched subserviency to "period of styleism" altogether on one side. When the Elysium of Architecture is gained, and the Millennium has arrived, a principle of this sort, according to some, will be recognized, and architecture no longer be diluted by elements of copyism, puerility, and falsehood any more than Horniman's pure unadulterated tea. But as that old serpent, the devil, is still at large, architecture, with other mundane arts, exhibits the "trail" thereof.

A building should be thoroughly consistent with truthful principles, and the objects to which it is to be devoted; and if so, the style is sure to be good and pleasing; that is, of course, if the building be not in the hands of ignorance or incompetency. I am aware I may possibly be charged with Utopian ideas, but who can contemplate the architectural works that have recently been erected in the Metropolis and elsewhere upon this basis without at once acknowledging the force of this principle; a principle which, without doubt, inspired the architects of past ages, and which is happily beginning to release the architecture of the present day from the thraldom and Egyptian, Roman, and Grecian bondage in which it has so long struggled.

I visited the other day the building called the "Tabernacle," erected for the Rev. Mr. Spurgeon. Now, in this instance, we actually have no cement, but genuine stone columns, &c.; which, although ill-proportioned, are truthful and substantial. Of course, sir, the question might occur as to, why on earth, copies of a temple erected to some heathen deity (which the "devil invented," as well as Gothic architecture) should stand at the entrance of a house dedicated to the worship of the true GOD. The excellent arrangement of the interior generally, I could not stop sufficiently to admire, the ventilation being so awful that its effect, as well as that of the sermon, was lost upon me.

Near to this "Tabernacle"—more properly speaking Temple—is a most wonderful building, of cementitious development, which is called "Taylor's depository." It seems to be the central office, from whence issue those astounding pictures of railway engines, and advertisements "To families removing," which are to be met with at almost every railway station in England—caricatures of locomotives at which every honest locomotive coming into the station indignantly protests; but as the highest art here seems to be £. s. d., the public eye winks at the display of artistic feeling exhibited:—though one certainly does see illustrated advertisements at the railway stations which have more respect to truth and the public gaze.

But what has this to do with style in architecture? "Much every way." Something glaring, showy, sham, bold—something mimicking something else; something in "the decorated," "perpendicular," Grecian or Roman "style," or in the "style prevalent during the ——teenth century,"—to effect which a little "compo," mimickery, deception, and a state of mental coma are "all that is necessary."

I cannot here avoid alluding to another work; being a public building devoted to christian worship, put up by the same builders that erected the "Tabernacle." My eye was arrested by it in passing the other day along Claverton Street, Pimlico. Here the truthfulness of the "Tabernacle" has left him, for money is wasted upon huge brick cylinders coated with "compo," supporting nothing, and meaning nothing—except—but never mind.

Style, sir, is a bugbear,—that is to those who practice architecture, manufactures, baking, and plain cookery at the same time. Not that the *past* should in any way be ignored: not by any means. The past is, perhaps, our best teacher, whose form we have been portraying—or, rather, grotesquely caricaturing—instead of learning its lessons. Nor is the present devoid of moral; but, indeed, more than any previous time abundant in examples of "what to eat, drink, and avoid." But, for Heaven's sake, let there be something beyond a *reproduction* of the past or the present. Don't let us have copies of copies, and then such *bad* copies. Don't let us continue to have things in this, that, or the other "style." To adopt a past style is mere copyism; to dub any present style with a name is foppery. I have heard the architecture of the present day styled the "Victorian." This, while preposterous in its prematurity, also indicates that tendency to "finality" that exists to such a large extent in the architectural as well as the political world;—a stupid idea, that, if allowed to prevail, is simply fatal to all originality and improvement. Why, Sir, I have heard of an architect putting up the same spire sixteen times, and thinking that "the more the merrier," in point of credit; although the good people, no doubt, thought they were paying for something new and original, instead of a second-hand affair. The idea of an architect copying and recopying his own productions is almost as amusing as that of one which came under my observation of a builder-architect, whose own ideas on architecture being about worth 2d. per executed work, at every opportunity embezzled those of architects, who little imagined, in their simplicity, that their genuine thought and artistic feeling were tending to such a development (devilupment) of style. This practitioner, I was told, became jealous of his principal assistant merely *looking at* a certain public building when he himself had slyly made tracings of the competition drawings of the architect by whom the building was carried out.

This, by the way, somewhat illustrates the working of the competition system, and suggests the cause why that large quantity of elaborate designs is necessarily detained so long (now nearly two years) by the "Carlisle Bridge Committee, Dublin." Still, one would have thought, sir, that the work of appropriation, amalgamation, and tracing might have been got through by this time. As it seems there are no funds, either for carrying out the project (which the Committee must have known before the hoax) or for remunerating competitors, why not have advertised as the Aldershott people advertise,—I see in yours of the 2nd instant,—"The Committee reserve to themselves the *right* of rejecting the whole of the plans"—which is certainly cool but clear.

Now these are some of the little things that render style such a vexed question. Often have I seen in your pages discussion as to the "possibility of a new style," and many may even now be "vexing their righteous souls" from day to day hoping to be the inventors of a "new style" some fine morning, as once men were hoping to discover perpetual motion. A "new style," in this view, is chimerical; not that there is any lack of constructive or artistic ability in the *bonâ-fide* architectural profession; but I cannot believe that any building, founded on copyism, appropriation, or deception of any sort, mental or material, or having for a basis *merely* £. s. d., will reflect credit on the architect, his employers, or, least of all, have the slightest effect in developing anything worthily distinctive in style. Although it may be thought that in this essay I have alluded to trivial matters affecting style, yet of this I am convinced, that the architecture of the present day is so affected and impregnated by such causes, that unless there be an improvement in these matters, much in the style of our architecture will be held in utter contempt by future generations; though many of the present abortions, thank heaven,

> The clumsy towers, the gim-crack palaces,
> The stupid temples, and the ugly shams,
> The ill-constructed botches bungled up
> By wretched misled mortals, shall dissolve,
> And, like the fabric of a hideous vision,
> Leave not a wreck behind.

HI JACULIS ILLI DEFENDERE SAXIS.

THE NOISE FROM PAVED ROADS.

A "READER" says,—In answer to the inquiry of "A Corporation Surveyor," as to the best means of mitigating the noise from carriage-way pavements, it has been suggested that veneers of any kind of wood be placed between each course of carriage-way stones. This plan was recommended some thirty years ago, and mentioned in the *Mechanic's Magazine* as "striated pavement."

Another correspondent, "JAS. DUTHIE," says, —Pave the "sets" about 1 inch apart, fill up the joints with small clean hard stone chippings; so put a layer of these chippings, 1½ inch deep, l over the pavement, except the channels; hen pour out just sufficient boiling asphalte to bind the whole together in one solid mass. Boulder pavements can also be done in a similar manner; and they are better adapted to this plan than sets, as the joints are larger and more irregular, thereby giving a greater binding principle, and causing the layer of chippings to unite with and adhere to the boulders much better than to sets. In streets or districts where heavy narrow-wheeled traffic is great, the layer of chippings would occasionally get worn through to the pavement, and require repairing, thereby causing some little inconvenience to the public.

WATER SUPPLY FOR THE SERPENTINE.

A MINIATURE TEMPLE is now being constructed on Duck Island, St. James's Park, to enshrine a steam-engine of 20-horse power, for the purpose of drawing an increased supply for the Park waters *from the sewage of Westminster*. The quality of water already furnished from that source has been found, on analysis, faulty; in fact, as the water issues from the pumps now in action, it is offensive to the olfactories; and it is not likely that the well 28 feet deep and 8 feet in diameter will yield a purer tribute when taxed more heavily.

Some six years back a well was sunk for the same object at the head of the Serpentine, Bayswater; that well, too, has been of late deepened, and is capable of furnishing double the quantity now pumped from it, and of the purest water: but the odd conceit of drawing back and circulating the stagnant pool of the Serpentine itself has been practised throughout the past summer, and one of the two small engines at work there has been used in carrying out that crotchet; while the other drew from the depths a small quantity to feed the fountains!

The condition of all our ornamental park waters discovers but too clearly that the sources of augmentation are polluted; and although constant circulation may modify the quality of the lake, it cannot adapt it for the use of the bathing frequenters of summer. Why, then, travel a mile and a half down hill to obtain and force up that supply which nature provides abundantly, and of the purest quality, at the most convenient point—the head of the lake?

The vale of the meeting of the waters, however it may have suited the fantastic imaginings or objects of some projectors, has not as yet made both ends meet, either in a utilitarian or profitable sense. Consult the working engineer at Kensington Garden well, and he will show that there is water enough in the well to employ all the power of both engines which are now employed on the divided work. A. B.

THE PEABODY BUILDING IN EAST LONDON.

THIS building, on which is being expended a part of Mr. Peabody's gift, is rapidly approaching completion, and in about a fortnight the greater number of the apartments will be occupied by tenants, who have applied in such large numbers that a selection has been necessary, and there can be no doubt that several similar buildings would find respectable tenants. This is so far satisfactory; but, after a careful inspection, we are forced, somewhat unwillingly, to say that this structure will not meet the demands of the poor, who are so much crowded together and so ill lodged in this district. We shall find here well-paid mechanics and others, who cannot be designated as belonging to the London poor, for whom provision is so much needed: and even to fit the building for the class mentioned we are mistaken if some important changes will not be required. But before alluding to these we will glance at some of the sets of apartments, each containing two rooms. The size of these two rooms is about 13 feet by 15 feet 6 inches, and 8 feet 7 inches in height; a space sufficient for the health of a small family. The ventilation has been well attended to, and the closet accommodation well cared for; the closet in which food is likely to be kept is ventilated by a window towards the open air. In the front room, which will be used as a sitting-room, there is a fire-grate, with boiler and oven, which is economical in the consumption of fuel; but in the other room there is no fire-place,—an arrangement which will be deplored when women are in their confinement, sick, &c. The want of a fireplace here will be felt particularly when we consider that there is no vestibule between the chief rooms and the corridor along which the apartments are placed on each side: the consequence being that directly the outer door is opened the room is completely overlooked; and besides, in cold weather, a current of cold air will rush in, which will be dangerous to delicate persons and young and tender children. We enter one of those corridors by an open staircase, similar in plan to those in the houses built for Miss Coutts. At the top there are two water-closets and lavatories for the men and lads, who live in the apartments in this portion of the building. At the other extreme end are water-closets for women and young children, a lavatory, baths, &c., and it should be mentioned that the arrangements and construction of these are of the best kind. There are also baths and shafts, by which the dust is conveyed to the basement. There is a plentiful supply of water laid on, and care has been taken by an exhausting process to prevent the freezing and bursting of the pipes. There will, no doubt, even when all is finished, be at times a very strong current of air along those corridors which, with the branching rooms, are at a considerable elevation. It is, therefore, most necessary for health and that degree of privacy which is much to be desired where families live, to have a small lobby to the apartments, which might be either projected into the corridor,—there would be ample space for all necessary purposes,—or there might be a partition somewhat higher than the door inside, which would break the current of air, and prevent the place from being overlooked by every one who happens to call. Matters such as these are of more consequence than may be supposed by some who have attended more to peculiar kinds of construction than the peculiar requirements and feelings of those by whom such houses are intended to be occupied. At the model building in St. Pancras-road, double doors were actually necessary for the preservation of health, and the prevention of serious bronchial and chest diseases. No one can appreciate the advantage of good ventilation more than we do; but right ventilation does not consist of violent currents of air.

Another point should not be altogether neglected in buildings of this description,—for men, women, and children are benefited by the neat appearance of the interior of their humble homes. The rooms here are, however, all in the rough; the brick courses and mortar less smoothed off than they might have been. On this point it may be admitted, that for the general purposes of health, rough walls would prove as efficient as others. Still, there is that in rough brickwork which, if even it be well whitewashed or coloured, does not prove pleasant to the eyes of neat housewives. We believe that wall-paper in tenement dwellings is, for various reasons, to be objected to; but a good coating of plaster, nicely coloured, would not much increase the cost, nor would it be injurious to health, while it would add to the comfortable appearance of the rooms, and be a nice foil to the pictures and other ornaments which the wives of the working classes like to display.

The peculiarity of the under part of this building consists in two rows of shops, each forming parts of the frontage, which will eventually form sides of two important thoroughfares. There are extensive suites of rooms (kitchen, &c.) in connexion with the shops. The shops with the apartments will be let, we are told, at a rental of about 70*l.* a year each.

If trade here should prove prosperous, the shops, &c., would assist in making up any deficiency which might arise from the apartments alone. But there are arrangements here not quite satisfactory. Some of the rooms are at a considerable distance below the surface of the footpaths, and it is said that the lower rooms are almost level with the new main drainage which has been completed here, so that it may not be a very easy matter to carry off the sewage effectually.

In many parts of the metropolis the combination of places of business with healthy dwellings above for the industrious classes might be carried out with advantage. We, therefore, look anxiously for the money results of this experiment; for if it should be proved that shops and places of business can be let at a sure rental of from 70*l.* to 80*l.* a year, it might materially reduce the rental of rooms above.

We are told that the cost of the new building will be about 22,000*l.*, and that the rent of each set of two rooms is 4*s.* per week, and that of those of three rooms, 5*s.* per week. There are a few single rooms at a lower rent.

As we have before said, these apartments will not be found to meet the wants of the poor dwellers in Bethnal-green, and in other parts of the metropolis, who can only afford to pay a weekly rent of from 2*s.* to 3*s.* a week, and more than any other class require help and care. It was expressly stipulated when Mr. Peabody's munificent gift was given, that the money was to be expended for the especial behoof of the London poor. We trust, therefore, that, although this building will not be without advantage, the directors will next direct their serious attention to supply accommodation in harmony with Mr. Peabody's original intention.

ONE WHO KNOWS.

CONCRETE BRICKS.

SIR,—I have read a report in your number of the 2nd inst., as to the patent concrete stone. Having been present at Mr. Dines's yard, Thames Bank, London, when "other specimens" of concrete stone, as well as Mr. Ransome's and Mons. Coignet's were tried and tested, having regard especially to the latter, in the presence of the gentlemen, or some of them, whose names are put forth in your report; and as Mons. Coignet's specimens stood lowest in the scale (in fact, several did not bear a ton by hydraulic pressure), I think in fairness some mention should have been made of "other specimens of stones similarly prepared."

Doubtless Mr. Ransome's productions are very excellent, and may, to some extent, supersede masons' work; but the main feature in all inventions is *cost*. Allow me to say that I have made bricks, moulded plain, comparatively non-absorbent, without burning, equal to Suffolk malms, from *sand, gravel, chalk, clinkers, road-dirt*, or *seabeach*, and, to be practical, they are to be seen in the erection of two villas at Reigate, where they have withstood the rain, sun, frost, and every-day weather; and I have no hesitation in saying, that wherever such materials as I have described are to be had, say, taken out of a basement or for a nominal sum, these bricks, or any other article—drain-pipes,

for instance, or balusters—can be made at any season of the year, and be fit for use in two or three days, without machinery or skilled labour, at a cost which will put Suffolks or any other facing-bricks in the shade; while an inferior article for inside work will compete with stocks.

These bricks and other specimens were made in the presence of the gentlemen alluded to on Mr. Dines's premises. In two months after they were tested, and I believe I am correct in stating, stood more pressure than any other concrete stone produced, viz., 12 and 20 tons; Ransome's cubes, 7, 9, and 12 tons; Portland stone, 9 and 12 tons. I have been looking forward for a detailed report of these proceedings from the gentlemen who were present, which would most likely throw a little more light on the matter, more especially as bricks are daily and yearly increasing in demand and price: I take it, therefore, any process that will tend to increase supply is of very great moment.

It is right to say, that no strain was put on any of the specimens, but simply hydraulic pressure. I have, however, no fear on that score.

J. W. SUMNER.

*** The report in our pages to which the writer alludes, referred solely to a trial of one particular material at one particular place. We have no official information of the doings of the committee generally. They will doubtless publish a report themselves hereafter. The bricks mentioned by our correspondent have been described in our pages before now.

DEMOLITION.

So far from being able to help Mr. C. H. Smith in his inquiry as to some graphic records of "Canons," that meteor of pageantry and pomp, immortalised by Pope in lines that, though penned in no friendly spirit, will at any rate rescue the name of the mushroom Duke of Chandos, the founder of a palace destined to be of little less brief duration than that of ice which rose at the mandate of the imperial Russ. As to Canons, it is by no means a solitary instance of coldly and calculatingly perpetrated demolition. For, as if it were not enough that an architect's work should be especially liable to extinction by fire, it is exposed to wanton, at least deliberately planned demolition. Canons is by no means a solitary instance of ephemeral existence. The mansion at Blackheath, erected for Sir Gregory Page by the same architect, proved equally transitory; in fact, a full catalogue of more or less important buildings, which, though spared by fire, have been more ruthlessly swept away by human hands, would be a not little lengthy one, and to such as myself a rather melancholy one also. The disappearance of Vanbrugh's ultra-ponderous, elephantine Eastbury is not at all to be regretted; but some effort ought to have been made to preserve to us the princely Wanstead. Alas! that there should be a far more insatiate and inexorable spoiler than Time!—

> "One at whose touch e'en granite melts away,
> And what's for ages built lasts but a little day."

The hyperbole just uttered may be excused when we call to mind only some of the doings in our own time, of industrious destructiveness, which often masks itself under the name of improvement.

Where is now Holland's Carlton House; that work of his which forcibly, as the French say, "accused" him of being gifted with true feeling for the picturesque of architecture and for *bravura* of perspective effect? The view obtained from the first vestibule, through the deep portico to the open Ionic colonnade, and beyond that into Waterloo-place, was not a little piquant; certainly quite unmatched, nay even unapproached by aught else in our metropolis. Most fascinating, too, was the circular dining-room, even when shown in daylight *déshabille*, just before the house was dismantled. A similar fate has befallen another work of Holland's,—the India House. Neither the Ordnance Office, Margaret-street, Westminster, nor the Excise Office, Broad-street, is now to be seen except in engravings, and those merely pictorial views; for, strange to say, they are not represented technically, and so far trustworthily, in any of the publications taking the title of "Vitruvius Britannicus," although greatly more deserving of being so recorded than are very many of the subjects selected for representation, some of them being of the most hum-drum character.

Of demolition, on a tolerably large scale, we have just had a sample in the sudden sweeping away of Hungerford Market, in what may be called its infancy. Even more potent than Hannibal's vinegar, an Act of Parliament would not only saw through the Alps, but melt the whole of them quite away. With this remark I lay down my pen for the present.

AN ART LOVER.

P.S.—May I be permitted to inquire who was the Miss Patrickson who has almost Boswellized Fuseli?

ORANGE-PEEL.

PASSING down Piccadilly the other day, I saw a lady in the act of falling, but she was fortunately prevented reaching the ground by the gentleman at her side. I continued my walk to the Strand, and there, just beyond Somerset House, a gentleman who was before me suddenly slipped his legs from under him, and fell with violence to the ground. On raising him up, for he was unable to rise without help, he seemed to be fainting from excessive pain. I, with others, hastened to his assistance, and conveyed him to a neighbouring surgeon, fortunately at hand and at home. It was soon discovered that he had sustained a fracture of the small bone of the arm, complicated also with another of the elbow. This was a serious accident, and will probably be felt as such by the sufferer for the remainder of his life.

Now, both these instances,—the one so nearly occurring, and the other so disastrously accomplished,—were caused by the foot slipping over a piece of orange-peel, thoughtlessly, if not wantonly, thrown on the pavement. In the course of my walk to the City and back again to the West-End, I had the curiosity to count, as far as I could, the pieces of peel on the pavement, and I found they amounted to 151. Of course, I could not count them *all*, and it was only on *one* side of the street that I did count. The accidents arising from this cause are neither few nor far between, but are of frequent occurrence; and, though a small number of them may be noticed in the papers, the greater part of them we hear nothing about.

What is the remedy for this most treacherous street evil? A very easy one, I believe. Let it be the duty of those stately street-walkers, the police, to kick with their feet these traps for the unwary off the pavement on to the roadway, where they would be immediately rendered harmless by the traffic going on there.

There would, I think, be no difficulty in making this very simple and easy matter a part of the police duty. It would be found that it would not add much to *their work*. I should rather say it would add to their amusement, and that they would like it as a relief to the monotony of their slow and solemn march. T. B.

THE COMPETITION FOR NEW MUSEUMS AT SOUTH KENSINGTON.

IT appears that there is to be a competition for the Museums that are to be erected on the site of the International Exhibition: let us hope that it will not turn out as great a *fiasco* as that for the Government Offices.

Most competitions notably fail to attain the object for which it is professed they are intended—that of obtaining the best possible design in relation to cost. This is partly the fault of committees, or agents who represent such amongst the public who are interested in the business; but chiefly that of architects themselves.

It is the fault of committees, because, amongst other reasons, the time devoted to the consideration of the designs submitted is ridiculously short; and because amateur judges are generally incompetent to perform the task of selection. They may be men of taste to a certain degree; and therefore it may be urged they surely may select the design that pleases them best, referring to professional advisers for matters of detail—matters of taste are not to be questioned. This, as regards architecture, I entirely deny; and as the competency of a judge depends upon the amount of taste he possesses, I will endeavour to define what is taste in matters relating to architecture. Taste may be termed the faculty of perceiving beauty. As there are two sorts of beauty,—that which is external, speaking to the senses, such as that of form and colour; and that which appeals to the intellect, such as beauty of design, fitness of means to an end, propriety;—so there are two degrees of taste,—that which is natural and inherent in some men, and which leads them instinctively to take pleasure in fine contours or beautiful combinations of colour; and that which is acquired, enabling a person to judge of architectural style, character, stability, and other qualities inseparable from good architecture. The union of these two degrees of taste is required in a good judge of architectural design. The mere symmetry arising from proportion would please the man of natural taste; but the man of educated taste would not be satisfied unless he found combined with it that fitness and character which observation had taught him to look for. This is a digression; but it is intended to show that as but few amateurs can have devoted sufficient time to the study of architecture, few amateurs are competent to be judges in a competition.

But the chief fault of the failure of competitions lies with architects themselves, who, forgetful of the dignity of the art they profess, allow themselves to be treated as a better sort of tradesmen. Advertisements for competitive designs are generally considered to be pledges, on the part of those issuing them, that if architects will devote time and attention to the production of designs, they on their part will, to the best of their ability, and without favouritism, select the best design from amongst those submitted, to be carried into execution. But how are these conditions carried out? We find that all sorts of underhand means are permitted to be employed by the friends of competitors, in order to influence the decision of the committee; and even if a tolerably fair decision be reached, the architect is often "shelved" on the most frivolous pretence, or through the influence of some one on the committee, or possibly a non-competitor is employed to carry out the work.

Now, these things manifestly should not be; they involve the honour of all concerned, not only of committees or their agents, but of the whole body whom they represent. Yet architects are so accustomed to these things, that they look upon them quite as matters of course, and tamely submit to them without a protest.

But it will be asked, how are these evils to be remedied? By architects maintaining the dignity of their profession, and requiring that justice shall be done them in all public competitions. In the case of the competition under consideration, common sense calls for the following measures:—

1stly. Let the instructions be clear and explicit, with some limitation as to style and expense, and let them be rigidly enforced.

2ndly. Let the judges be chiefly, if not entirely, professional men.

3rdly. Let it be understood that the successful competitor shall, without fail, be entrusted with the erection of the building.

Unless some such measures as these be taken to ensure a just decision, architects whose time is valuable to them will feel inclined to keep out of the competition.

NEMO.

CASES UNDER THE METROPOLITAN BUILDING ACT.

Default of Notice.—Messrs. Glenn, builders, of Islington, were summoned to the Clerkenwell Police-court, before Mr. D'Eyncourt, by the district surveyor of South Islington, for making certain alterations at Mildmay Park Chapel without giving two days' previous notice to the surveyor, as required by the Act. When applied to, they had stated they were about to do nothing but an area wall and a little plastering; whereas, two staircases down to schools in basement had been erected. The defence was, that nothing was said of giving notice in the specification; and the "surveyor" to the work had told them it was not necessary. Ordered to pay a fine of 20s., and 23s. costs.

Insufficient Footings.—Mr. R. Walkington, of Great Suffolk-street, Borough, was summoned at the instance of the same surveyor, for having built wall of conservatory at back of No. 7, Newington-green, without proper footings. Ordered to amend forthwith, and pay costs.

Division of Buildings.—Mr. Jas. Few, Hamilton-place, Highbury-grove, was summoned by the district surveyor of South Islington for dividing a stable building, recently erected in the rear of Park-road East, Highbury, with wooden partitions, into two or more tenements, each having a separate entrance from without; contrary to sec. 27, which declares tenements so divided to be distinct buildings, and requires them to be separated by party-walls. The builder had been warned during the progress of

the building that, if it were to be divided for more than one occupation, party-walls would be required. Ordered to amend the irregularity by the erection of proper party-walls.

Books Received.

The Book of Common Prayer. With Illustrations. London: JOHN MURRAY. 1863.

THIS Book of Common Prayer is no common Prayer-book; every page has a floral border and initial letters, designed by Mr. Owen Jones; and scattered throughout there are forty outline illustrations from pictures, drawn by Mr. G. Scharf. These latter are mainly after Raffaelle and Overbeck; but, for the illustration of Public Baptism, Matrimony, &c., Mr. H. Warren and Mr. J. C. Horsley contribute drawings. Add to what we have said that the whole is beautifully printed, and the assertion that this is an uncommon Prayer-book is surely justified. The only objection we can make applies to some of the red initial letters, which are splotchy. The borders, several of them very elegant, are so numerous that the book will be suggestively useful to "designers" and decorators.

Miscellanea.

ROYAL LODGE CHAPEL, WINDSOR. — The addition of a chancel and a royal pew to the Royal Lodge Chapel, in Windsor Great Park, has been recently completed, and consecrated by the Bishop of Oxford. The style is Early Decorated, and the additions are built with Heath stone (the same as at Windsor Castle) with dressings of freestone. Mr. Teulon was the architect, and the works were executed by Messrs. Fassnidge & Son, of Uxbridge. The carving is by Mr. Earp. The east window is occupied by a rich glazing of Scripture subjects, by O'Connor.

LANDLORD AND TENANT.—Tenant's fixtures are not chattels until severed; and it is competent to a landlord to make an agreement with his tenant which shall, notwithstanding an abandonment by the tenant of his property in such fixtures during the term, in the event of an execution against the tenant, enable the landlord to re-enter and retain such fixtures against the execution creditor. This was the holding of the Court of Exchequer Chamber in the case of Dumergue *v.* Rumsey.

NEW BARRACKS FOR THE HOUSEHOLD BRIGADE AT CHELSEA.—Earl de Grey and Ripon, Secretary of State for War, has decided to appropriate the plot of land which adjoins the Hospital for Pensioners, at Chelsea, to a new barracks for one of the regiments of the household brigade of cavalry. The land on which the barracks will be erected is directly opposite the new buildings which have been erected for and recently occupied by the Guards, and covers an area of about sixteen acres. As soon as the necessary arrangements have been made the works will be immediately commenced. We may hope this is intended to supersede the threatened barracks near Walton-place, Chelsea.

EMPLOYERS AND WAGES A HUNDRED YEARS AGO.—In the July number, 1769, of the *Universal Museum and complete Magazine of Knowledge and Pleasure*, printed for J. Johnson and J. Payne, at No. 8, Paternoster-row, I find the following: "On Thursday, three eminent master tailors at the west end of the town were committed from the public office in Bow-street, for fourteen days, to Tothillfields Bridewell, for giving greater wages to their journeymen than is allowed by law." The above may perhaps be worthy of a nook in the *Builder*.—W. L.

ILLUMINATED SHEETS.—Mrs. Delamotte* has published three illuminated subjects,—Faith, Hope, and Charity,—from drawings by the late Mr. F. G. Delamotte. They have been reproduced by Messrs. Day & Son, and will doubtless please many. Charity seems to us the most successful of the three.——Of a plainer kind, but with a value of its own, is a sheet of "Directions and Precautions against Fire," intended for hanging up in places where the occasional observation of it may serve to induce calmness and presence of mind at the needful moment. It may be usefully distributed.

* 14 and 15, Beaufort-buildings, Strand.

ROYAL GALLERY OF ILLUSTRATION.—The *Opera di Camera*, "Jessy Lea," by Messrs. Oxenford & Macfarren, will, after a limited number of representations, give place to Mr. and Mrs. German Reed's new Egyptian entertainment, written by Mr. Shirley Brooks, and in which Mr. John Parry is announced to appear.

ELECTION OF SURVEYOR TO THE BIRKENHEAD COMMISSIONERS.—The road and improvement committee of the Birkenhead commission have appointed Mr. T. C. Thorburn, C.E., at present surveyor to the borough of Derby, to be surveyor to the Birkenhead commissioners, at a salary of 500*l.* a year. Mr. Thorburn is a native of Leith. The market, recently erected at Derby, was designed by him.

PRIZE COTTAGES FOR THE LABOURING CLASSES.—One hundred and seven designs for cottages have been sent in, in competition for the two prizes of 25*l.* each, placed in the hands of the Council of the Society of Arts by Mr. J. Bailey Denton, and offered for the most approved designs for cottages to be built singly or in pairs, at a cost not exceeding 100*l.* each. It will be remembered that one prize was to be competed for by members of the Architectural Association, and the other to be open to general competition. The latest date fixed for the reception of the designs was the 1st inst.

TUNNEL UNDER LAKE MICHIGAN.—A contract for the construction of a tunnel, extending some two miles under Lake Michigan, at Chicago, for the purpose of supplying the city with pure water, has been awarded; the lowest bid for completing the same being 315,130 dollars. The contract is for a tunnel of 5 feet internal diameter, lined with brick. The tunnel is to be excavated 35 feet below the bed of the lake, and to have 4 feet of dip landward. Strainers will be fixed over the outlet to keep out the fish. The total area of the tunnel will be nearly 20 square feet, an area amply large enough to furnish water continuously to a city five or six times the size of Chicago in the present day.

EXHIBITION OF GLASS; EGYPTIAN HALL. — Messrs. Defries & Co. have filled the Dudley Gallery, Egyptian Hall, with a collection of their works in glass, which will doubtless tend to spread their reputation. The principal feature of it is the colossal candelabrum in cut glass, which has been executed by them for the Rajah of Secunderabad. This marvellous work, which, together with three similar ones, has been made at a cost of 20,000*l.*, is in its general design identical with that which attracted so much attention during the last days of the Exhibition of 1862. Rising to a height of 22 feet, and expanding at its base into an hexagonal figure 7 feet in diameter, while its 145 branches of cut crystal glass radiate from the massive central shaft in three tiers, and fill an almost equal space, the eye is impressed with the magnitude of the work. What is called an Altar Piece is another *tour de force* worth notice. Some very fine specimens of engraving on glass will also be found, as well as of ordinary table glass.

TYPO-ELECTRIC TELEGRAPH.—Chev. Bonelli's invention for printing by telegraph, is being exhibited at No. 7, Angel-court, Throgmorton-street, London. The message is transmitted in the following manner:—When given in at one end of the line it is set up in type, any errors that may occur being immediately discovered and corrected ere transmission. The row of type is then placed in the machine and passed along under a species of comb consisting of five points, each of which is connected by a wire with a corresponding point at the other end of the line. Underneath these last-named five points passes a plate of platinum upon which is placed a paper moistened with nitrate of manganese. Wherever the corresponding point touches the raised letter, it completes the circle, and the electricity, acting upon the solution, decomposes it, liberating the nitric acid and leaving the peroxide of manganese upon the surface of the paper in the form of a brown deposit corresponding with the type at the other end of the lines. The paper is then washed in water to clear away the remains of the solution, and to deepen the colour of the printing, and after being dried is transmitted to its destination. A set of five wires is requisite; but the same wires are used for the up and down traffic; and 400 messages of twenty words each, it is said, have been transmitted by its means in an hour. The proprietors of this telegraph have been enabled to reduce the charges, and transmit telegrams to Liverpool and Manchester, at the rate of 6d. per twenty words.

EXPLOSION OF A SHIP AT LIVERPOOL.—An immense amount of damage to windows and otherwise has been done throughout Liverpool and Birkenhead by the explosion of 11¼ tons of gunpowder, forming part of the cargo of a vessel called the *Lotty Sleigh*, bound for Africa, which took fire by an accident with petroleum or paraffine oil, which the steward was pouring out of a flask. No lives were lost. In the Exchange News Rooms alone 250*l.* worth of plate-glass was broken. Birkenhead suffered still more than Liverpool. Why was she not scuttled?

THAMES EMBANKMENT: METROPOLITAN BOARD OF WORKS.—At the last weekly meeting of the Board, the meeting went into a committee of the whole Board on the Thames Embankment, and considered a report from the solicitor as to the substitution of other securities for Messrs. Ritson & Co.'s contract for the embankment from Waterloo Bridge to the east end of the Inner Temple, than those first proposed by that firm. The competency of the sureties proposed, and of Messrs. Ritson to carry out the work, were made out to the complete satisfaction of the Board. It was therefore recommended that the securities be accepted.

SOLID SMOKE.—A working man, writing to the editor of the *British Workman*, states:—"Since I gave up smoking, I have put into a box the amount that I formerly spent every week in tobacco. At the end of the year, on opening the box, I have counted out a sum of money sufficient to provide myself with periodicals and newspapers for the year, which sum I called '*Solid Smoke!*' A friend one day called and asked me, 'Have you found the philosopher's stone?' 'No,' I replied, 'I don't turn the smoke into gold, but prevent the *gold* from turning into *smoke*.'"

SCULPTURE.—A reredos of Caen stone has been sculptured for the chapel attached to the new Beauchamp Almshouses at Newland. The subject of the sculpture is the Crucifixion, in high relief. The reredos will be surmounted by canopy work, supported by angels, and the sides will be ornamented by incised foliage, filled with dark cement. Mr. P. C. Hardwick is the architect of the reredos, and Mr. Boulton, of Worcester, the sculptor. Another work just completed by the same sculptor, is a series of bas-reliefs, to be used as tympana in the arches of the new townhall at Northampton. There are eight of these, four of which are illustrative of Parliaments held in that ancient town. Mr. Boulton has likewise executed a series of figures in wood, of angels and archangels, for the stall-ends in the choir of Hereford cathedral.

FETTES COLLEGE, EDINBURGH. — Contracts have been entered into for the erection, at an expense of about 80,000*l.*, of a college which, when completed, will be one of the greatest of the educational institutions of the city of Edinburgh. The fund for the building and endowment was bequeathed by the late Sir William Fettes, who died in 1836, in his eighty-sixth year, leaving property in the hands of trustees, which, after paying various legacies and bequests, was valued at 166,000*l.* Since 1836 the fund has increased to from 300,000*l.* to 400,000*l.* by the careful management of the trustees, and it has now been resolved to carry out the design of the testator. The site of the new building, which will be surrounded by 20 acres of playground and garden, is on the north-west of the town. The design is by Mr. David Bryce, of Edinburgh, architect, exhibiting a central tower surmounted by a spire, in a style almost entirely new to the locality.

LOCOMOTION BY HYDRAULIC POWER. —Mr. W. Symons proposes, for metropolitan underground or other railways, to have fixed steam-engines at convenient distances, whose work would be to pump water into hydraulic accumulators; this water-power under pressure to be conveyed in pipes along the railway: at proper distances wheels, as in Messrs. Hawthorn's plan, must be placed, but instead of wire ropes each set of wheels must have connected with it a small hydraulic engine; or, where two lines of rail were used, it might be placed between the two. The train, while progressing, would turn on and off the water as required, and thus no useless power would be expended. By the same sort of power he proposes to work through certain wide streets narrow lines of railway contained in and on tubular viaducts, with open latticed sides and bottoms, so as not to obstruct the light and air; these tubular viaducts to be supported on iron arches, one pillar of these arches to be in a line with the curb-stones of the street pavement, and the other against the houses.

APPOINTMENT OF ENGINEER AT THE SOUTH SHIELDS GASWORKS.—Mr. Sanderson, who has managed these works since their commencement, about forty years ago, having retired, about seventy applications were received in answer to an advertisement for his successor. Four gentlemen were selected from that number; and the appointment was, at last, obtained by Mr. Warner, of Bath.

MONUMENTAL.—It has been determined to erect a statue of Sir J. Outram in Aberdeen, where he received his early education.——A monument is to be erected in Cheshire to Field Marshal Lord Combermere. The monument is to be similar in character to those accorded to the Marquis of Anglesea and Lord Hill during their lifetime; but whether in the form of a column or an equestrian statue, has not yet been decided.

BURSTING OF SELF-ACTING BOILERS DURING FROST.—We hear of such cases this winter as heretofore. A school-room boiler at Halifax has burst, injuring a woman and breaking all the windows. Where kitchen ranges are fitted with self-acting boilers, persons ought to be careful about keeping up a constant supply of water. The danger of explosion chiefly arises when the thaw sets in, from a sudden flow of water into the dry and heated boiler. Therefore, if the feed-pipes are not well protected, and the supply of water is interrupted, the fire must not be re-lighted until the proper action of the pipes is restored. A correspondent of a contemporary, pointing out the danger arising from the freezing of pipes attached to bath-boilers, says:—"My object in writing to you is merely to point out the necessity of having for all such boilers a small spring safety-valve, capable of sustaining a pressure slightly above that of a column of water. This need not cost more than five or six shillings, and would afford perfect safety."

THE MONT CENIS TRAMWAY LOCOMOTIVE.—On the 2nd of January we noticed the intention to lay a tramway along the Mont Cenis pass, and that some experiments were being tried at Whalley Bridge. Now, and it is said highly satisfactory, trials have been made with the Alpine locomotive invented and patented by Mr. J. B. Fell. This locomotive is constructed on the principle of obtaining increased adhesion without increase of weight. In the centre of the carriage-way a raised rail, considerably larger than on the ordinary lines, is laid down, and the engine and carriages are fitted with well-lubricated horizontal wheels, which, by pressing on either side of the central rail, produces the adhesion necessary for working upon steep inclines. These horizontal wheels, it is said, facilitate the passage of curves; enable the driver to stop the engine in the middle of the steepest gradient; give a propulsive pressure of several tons; and by means of the flanges which underlap the centre rail, render it nearly impossible that the carriages can be overturned. The brakes are extremely powerful.

WARMING CHURCHES AT A CHEAPER RATE.—In the *Scotsman* newspaper there are some particulars as to the warming of Dunfermline Abbey Church by means of the patent multitubular heaters of Mr. W. Clark, jun., of Dunfermline. The church seats over 2,000 persons, is lofty in the roof, and lighted by about 1,900 square feet of glass, in small panes set in lead work, far from being air-tight. The area of the church contains upwards of 425,000 cubic feet of air; and yet, according to the *Scotsman's* correspondent, this church is sufficiently warmed at a cost for fuel of from 1s. 6d. to 2s. The fire "is lighted about six o'clock on Sunday morning; by seven o'clock it is giving a large amount of fresh warm air; and by the time the congregation assembles the temperature is at 55° to 57°, or above temperate, and by mid-day there is so much heat generated in the heaters that no further coaling is required for the rest of the day. The apparatus is so constructed as to throw into the church a constant, powerful stream of fresh air from the outside, which can be heated in its passage through the heaters to a temperature of 200°, or more if required. It requires no fan-blast, or artificial force whatever, and enters the church with such volume and power that its course can be traced upwards to the ceiling, 50 feet high; and such a constant influx of fresh warm air forces off the vitiated air and prevents the disagreeable effects of cold draughts from openings left for ventilation." The plan is said to have been equally successful in various other churches and other public buildings in which it has been tried.

SLATE-CUTTING APPARATUS.—An improved apparatus for cutting thick slabs or blocks of slate has been invented by Mr. G. A. Huddart, of Brynkir, Carnarvonshire. The cutting or planing tool, which is of peculiar construction, is made to pass over the slab and cut a deep groove therein. In carrying out his invention he finds it convenient to operate with two cutting tools simultaneously, one on the upper and one on the lower side of the slab. The slab is easily broken through if the grooves be made half way, but, if desired, the slab may be cut completely through with the cutters.

AMERICAN RAILWAY SLEEPING CARRIAGES.—The New York and Erie Railway Company have just placed upon their road a sleeping-car, which is characterized as superb. It is about 60 feet long and 11 feet wide, with accommodation for fifty passengers. It is divided into three sections, each complete in itself, and each lighted by a chandelier from which the light is distributed by a radiant reflector that crowns it. The woodwork is white maple throughout. The upper or middle roof is lighted through stained-glass windows, which may be used for ventilation. Each set of berths is separated from those adjoining by sliding panels. At either end of the car is a toilet-room and water-closet, these completing the appointments of the New York and Erie sleeping-car. The road is soon to be supplied with a full stock of these cars for night travel.

THE VAUXHALL SCHOOL OF ART.—On Wednesday evening last, the chairman of the committee of management met the students of the Vauxhall School of Art, and explained that in consequence of the new minute issued by the Council of Education, the committee would be obliged to raise the fees of the school to all students not artisans; but to artisans and to those who would become such, the fees would remain as before. The committee were sorry to do this; but under the old code, when the masters had their grant from Government according to their certificates, the expenses of the school were almost more than the income would meet; and in the payment by results obtained through the artisan class of students, the money granted by the Government would be so much decreased, that if the services of the masters were to be retained, the committee of the school would have to increase their salary. It was therefore decided that the new arrangement should commence on the 1st of March, that being the beginning of a new session.

TENDERS.

For manufactory, Broad-street, Ratcliffe, for Messrs. Hanson & Machin. Mr. John Belcher, architect. Quantities supplied by Mr. James Thonger:—

Downs	£10,173 0 0
Jackson & Shaw	9,985 0 0
Lawrence	9,783 0 0
Brown & Robinson	9,482 0 0
Coleman	9,474 0 0
Perry (accepted)	8,984 0 0

For the Brentwood Town-hall, Brentwood, Essex. Mr. W. G. Bartleet, architect. Quantities supplied by Mr. S. W. Iron:—

Lake	£2,070 0 0
Rivett	1,923 0 0
Stephenson	1,888 0 0
Sims & Co.	1,843 0 0
Wood	1,828 0 0
Browne	1,820 0 0
Winter	1,730 0 0
Conder (accepted)	1,685 0 0
Hammond	1,673 0 0

For three warehouses, for the London Wharfing and Warehousing Company, at their premises at Plaistow:—

Stevenson	£2,428 0 0
Wardle & Baker	2,140 0 0
Lamb	2,095 0 0
Richards	2,057 0 0
Tutt	2,045 0 0
Fisher	2,022 0 0
Hill, Keddall, & Co.	2,015 10 0
Tongue	2,008 3 0
Cubitt	1,998 0 0
Rivett	1,958 0 0
Scrivener & White	1,947 0 0
Pearson	1,915 0 0
Sims & Marten	1,890 0 0
Hughes	1,887 0 0
Page	1,735 0 0
Cordery	1,715 0 0
Ring (accepted)	1,670 0 0

For Inns of Court Hotel, Holborn. Messrs. Lockwood & Mawson, architects:—

Sewell & Son	£75,940 0 0
Myers	74,580 0 0
Hayward	69,400 0 0
Clemence	68,350 0 0
Lawrence & Son	67,426 0 0
Mansfield & Son	66,880 0 0
Gammon	66,406 0 0
Holland & Hannen	64,912 0 0
Hill & Keddell	64,228 0 0

For the erection of a warehouse, stables, offices, &c., in Oxford-street, for Mr. Marshall. Mr. Thomas W. Willis, architect. Quantities supplied by Messrs. S. B. Wilson & Son:—

Macey	£4,966 0 0
J. & J. Coleman	4,849 0 0
Deards	4,765 0 0
Henshaw	4,548 0 0

For restoration of and additions to the parish church of Clutton, Somerset. Mr. John Norton, architect:—

Brock	£1,898 0 0
Banner	1,705 0 0
Beavan & Son	1,683 0 0
Wall & Hook	1,537 0 0
Lewis	1,500 12 0
Bennett	1,392 0 0
Streeter	1,340 0 0
Dives	1,130 5 0

For pulling down and rebuilding the south-west wing of Chelsea workhouse. Mr. George C. Handford, architect. Quantities supplied:—

Steer	£7,975 0 0
Cowland	7,945 0 0
Perrott & Neave	7,852 0 0
Godbolt	7,630 0 0
Rudkin	7,325 0 0
Ward & Co.	7,287 0 0
Bacon	7,283 0 0
Adamson & Sons	7,199 0 0
Scrivener & White	6,768 0 0
Simms & Marten	6,490 0 0
Elliott	6,142 0 0

For villa at Wandsworth. Mr. Eppy, architect. Quantities not supplied:—

Avias & Sons	£957 0 0
Adamson & Sons	924 0 0
Rudkin	895 0 0
Godbolt	795 0 0

For shop-front in Bond-street. Messrs. Wimperis & Freeman, architects:—

Fish	£190 0 0
Southall & Watson (accepted)	168 17 7

For restoring premises and part of damage by fire at No. 26, Milk-street, Cheapside, for Messrs. Charles & Thomas. Mr. Herbert Ford, architect:—

Rawlins (accepted)	£1,030 0 0

TO CORRESPONDENTS.

STOCKPORT.—Mr. T. H. Allen, architect, of Stockport, wishes us to state, in answer to our correspondent "A Stockport Cotton Spinner," that there is a representative of the architectural profession in that town beyond the firm alluded to.

F. P.—Student of the Noble Art (must commit the lists of the London photographers).—B.—J. L. S. (nothing is yet determined on as to the ultimate use of the metropolitan sewage).—J. L.—H. M.—L. de V. (declined with thanks).—Ch. le Cœur.—S. H.—B. C.—J. I. W. W. H. R.—A. W. T. (send Mr. B.'s address).—J. O. N. R.—Mr. McC.—J. R. E.—R. M. P.—M. D. (send information to the architect of the Metropolitan Board of Works, and it will be attended to).—H. B. & B.—J. G. B.—H. & K.—H. P.—F. B. B.—D. B. N. (Yes. He was employed as a surveyor; not as a builder. If he be employed to do the work, he will probably make no charge for the specification).—G. C. H.—C. J. H.—R. L.—J. H. B.—M. B. (in type).—B. N. S. (ditto).—"Vandyck in London" in our next.

We are compelled to decline pointing out books and giving addresses.

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THE Directors of the INTERNATIONAL FINANCIAL SOCIETY, in submitting this Prospectus to the public, call attention to the fact that the Company has been established to supply an admitted want in this country, where landed property is less negotiable, as a Fund of Credit, than in any other of the States of Europe, in most of which large financial associations, such as the Banks of Hypothecation in Prussia, Austria, and Holland, the Credit Foncier of France, &c. &c. make advances on Land with promptitude, at a moderate rate of Interest, and at small attendant expense.

These undertakings are all founded on the principle of the intervention of a Society, with large subscribed capital and consequent credit, enabling it to raise money on the most favourable terms, as an intermediary between borrowers, and lenders seeking investment on Landed Security.

The difficulty, delay, and heavy costs incurred in effecting the mortgage of even first-class property, are well known; and there are numerous valuable interests arising out of Land which are at present almost wholly unavailable as a source of Credit, especially in times of financial depression.

The Company will act as Agents between the investing Public and the Borrower. They will also make advances repayable at fixed terms, or by terminable annuities, on Landed Estate, and on every charge upon Land, such as County and Parish Rates, Rates levied on Land under Public or Private Acts of Parliament, Royal Charters, Commissioners of Sewers, Improvement Rent Charges on Private Estates, Towns Improvement Rates, Ground Rents, Harbour Trusts, &c.

All the necessary preliminary steps have been taken for applying to Parliament in the ensuing Session for a special Act in aid of the Company's operations; and with a view immediately to secure to the Company a field for the commencement of business, provisional and remunerative arrangements have been made for operations of an extensive character in connection with securities created for the Improvement of Land, under the Lands Improvement Company's Acts of Parliament, and which are preference charges on valuable private estates.

Upon the basis of the Securities thus acquired, the Company will issue Mortgage Debentures at fixed rates of interest, payable half-yearly, for shorter or longer terms, as may suit Investors; and such a system of registration will be adopted as will effectively protect the lenders from any over-issue of Debentures by the Company. It is well known that very large sums of money lie comparatively idle in the Provincial Banks, and in the hands of Trustees and private individuals, which it is believed will be readily invested through those Agencies in Mortgage Debentures founded upon real securities, and further guaranteed by a large uncalled capital, many of the securities constituting, as before mentioned, first-charges upon Land under special Acts of Parliament.

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